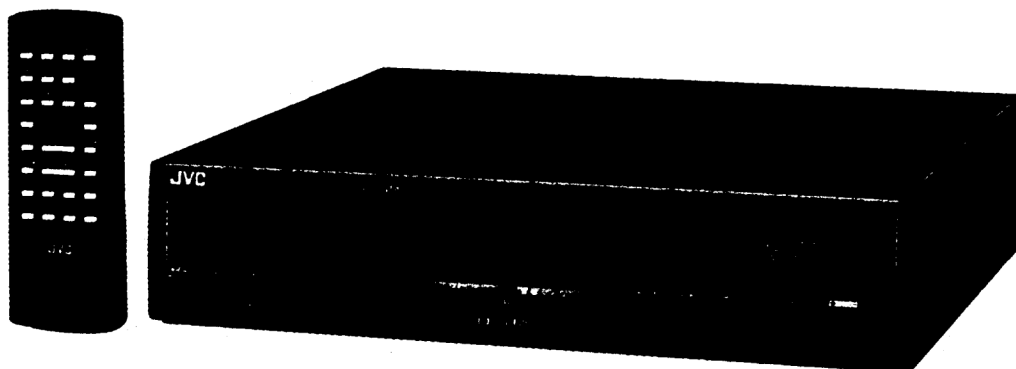


# JVC

## SERVICE MANUAL

### HR-DX20EM



**VHS**  
PAL

#### SPECIFICATIONS

##### GENERAL

Power requirement : AC 120 - 240 V~, 50/60 Hz  
Power consumption : 19 W  
Temperature  
    Operating : 5°C to 40°C  
    Storage : -20°C to 60°C  
Operating position : Horizontal only  
Dimensions (WxHxD) : 360 x 85 x 331 mm  
Weight : 5.0 kg  
Format : VHS PAL standard  
Tape width : 12.65 mm  
Tape speed : 23.39 mm/sec  
Maximum recording time : 240 min. with E-240 video cassette

##### VIDEO

Signal system : PAL-type colour signal and CCIR monochrome signal, 625 lines/50 fields  
Recording system : Rotary, slant azimuth two-head helical scan system  
Input : 0.5 to 2.0 Vp-p, 75 ohms, unbalanced.  
Output : 1.0 Vp-p, 75 ohms, unbalanced  
Signal-to-noise ratio : 43 dB (Rohde & Schwarz noise meter)  
Horizontal resolution : 250 lines

##### AUDIO

Recording system : Longitudinal track  
Input : -8 dBs, more than 50 k-ohms, unbalanced  
Output : -8 dBs, less than 1 k-ohm, unbalanced (100 k-ohms, load)  
Frequency range : 70 Hz to 10,000 Hz

##### TUNER

Tuning system : Voltage synthesized tuner  
Channel coverage : VHF band  
    47 - 68 MHz; CH E2 - E4  
    162 - 230 MHz; CH E5 - E12  
    CH M4 - M10 (Morocco)

##### Aerial output

UHF band,  
470 - 862 MHz; CH E21 - E69  
UHF channel 36, System G  
(Adjustable 32 - 40)

##### TIMER

Clock reference : Quartz-crystal  
Program capacity : 1-year programmable timer/  
    8-programs  
Memory backup time : Minimum 3 min.

##### ACCESSORIES

Provided accessories : Aerial cable,  
    Infrared remote control unit,  
    "R03/UM-4" battery x 2  
    Plug adapter

Design and specifications subject to change without notice.

# TABLE OF CONTENTS


Section	Title	Page	Section	Title	Page
	<b>Important Safety Precautions</b>				
	<b>INSTRUCTIONS</b>				
<b>1. DISASSEMBLY AND MECHANISM ADJUSTMENTS</b>			3.17	MECHACON CTL SCHEMATIC DIAGRAM .....	3-31
1.1	DISASSEMBLY .....	1-1	3.18	MECHACON (MAIN) CIRCUIT BOARD .....	3-33
1.2	MECHANISM ADJUSTMENTS .....	1-4	3.19	DECK TERMINAL, CASS. HOUSING, CAPSTAN MDA AND LOADING MDA SCHEMATIC DIAGRAMS ....	3-35
1.3	MAIN MECHANISM PARTS .....	1-5	3.20	DECK TERMINAL, LOADING MDA, CASS. HOUSING, A/CTL HEAD AND FULL ERASE HEAD CIRCUIT BOARDS .....	3-36
1.4	INSPECTION AND MAINTENANCE .....	1-7	3.21	MAIN (AUDIO, SERVO, VIDEO, MECHACON, TUNER/IF) CIRCUIT BOARD .....	3-37
1.5	MAIN PARTS REMOVAL AND REPLACEMENT ....	1-8	3.22	VIDEO UNIT AND VIDEO SCHEMATIC DIAGRAMS	3-39
<b>2. ELECTRICAL ADJUSTMENTS</b>			3.23	VIDEO (MAIN) AND VIDEO UNIT CIRCUIT BOARDS	3-41
2.1	PREPARATION .....	2-1	3.24	TIMER/DISPLAY/SWITCH SCHEMATIC DIAGRAM	3-43
2.2	SWITCHING REGULATOR CIRCUIT .....	2-3	3.25	TIMER/DISPLAY/SWITCH CIRCUIT BOARD .....	3-45
2.3	TIMER CIRCUIT .....	2-3	3.26	PRE/REC SCHEMATIC DIAGRAM .....	3-47
2.4	SERVO CIRCUIT .....	2-4	3.27	PRE/REC CIRCUIT BOARD .....	3-49
2.5	VIDEO CIRCUIT .....	2-5	3.28	RF CONVERTER SCHEMATIC DIAGRAM .....	3-50
2.6	AUDIO CIRCUIT .....	2-8			
2.7	TUNER/IF CIRCUIT .....	2-9	<b>4. EXPLODED VIEWS AND PARTS LIST</b>		
<b>3. CHARTS AND DIAGRAMS</b>			4.1	PACKING ASSEMBLY <M1> .....	4-1
3.1	CIRCUIT BOARD AND LOCATION .....	3-1	4.2	CABINET ASSEMBLY <M2> .....	4-2
3.2	GENERAL INFORMATION .....	3-2	4.3	CHASSIS ASSEMBLY <M3> .....	4-3
3.3	BOARD INTERCONNECTIONS .....	3-3	4.4	MECHANISM ASSEMBLY <M4> .....	4-4
3.4	AUDIO BLOCK DIAGRAM .....	3-5	<b>5. ELECTRICAL PARTS LIST</b>		
3.5	SERVO BLOCK DIAGRAM .....	3-7		SWITCH REGULATOR BOARD ASSEMBLY <01> .....	5-1
3.6	VIDEO BLOCK DIAGRAM .....	3-9		MAIN BOARD ASSEMBLY <03> <43> .....	5-2
3.7	SYSTEM BLOCK DIAGRAM .....	3-11		VIDEO UNIT BOARD ASSEMBLY <05> .....	5-9
3.8	PRE/REC BLOCK DIAGRAM .....	3-13		AUDIO/CONTROL HEAD BOARD <12> .....	5-11
3.9	SWITCH REGULATOR AND REGULATOR (MAIN) SCHEMATIC DIAGRAMS .....	3-15		TIMER/DISPLAY/SW BOARD ASSEMBLY <21> .....	5-11
3.10	SWITCHING REGULATOR CIRCUIT BOARD .....	3-17		UPPER DRUM BOARD <41> .....	5-12
3.11	SERVO SCHEMATIC DIAGRAM .....	3-19		DECK TERMINAL BOARD ASSEMBLY <51> .....	5-12
3.12	SERVO (MAIN) CIRCUIT BOARD .....	3-21		LOADING MDA BOARD ASSEMBLY <55> .....	5-12
3.13	AUDIO SCHEMATIC DIAGRAM .....	3-23		CASSETTE HOUSING BOARD <56> .....	5-12
3.14	AUDIO (MAIN) CIRCUIT BOARD .....	3-25		FULL ERASE HEAD BOARD <61> .....	5-12
3.15	TUNER/IF (MAIN) SCHEMATIC DIAGRAM .....	3-27	<b>6. TECHNICAL INFORMATIONS</b>		
3.16	TUNER/IF (MAIN) CIRCUIT BOARD .....	3-29	6.1	CPU PIN FUNCTIONS .....	6-1

# Important Safety Precautions

Prior to shipment from the factory, JVC products are strictly inspected to conform with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## ● Precautions during Servicing

1. Locations requiring special caution are denoted by labels and inscriptions on the cabinet, chassis and certain parts of the product. When performing service, be sure to read and comply with these and other cautionary notices appearing in the operation and service manuals.

2. Parts identified by the  symbol and shaded (■) parts are critical for safety.

Replace only with specified part numbers.

**Note:** Parts in this category also include those specified to comply with X-ray emission standards for products using cathode ray tubes and those specified for compliance with various regulations regarding spurious radiation emission.

3. Fuse replacement caution notice.

Caution for continued protection against fire hazard.

Replace only with same type and rated fuse(s) as specified.

4. Use specified internal wiring. Note especially:

- 1) Wires covered with PVC tubing
- 2) Double insulated wires
- 3) High voltage leads

5. Use specified insulating materials for hazardous live parts. Note especially:

- |                    |                                      |            |
|--------------------|--------------------------------------|------------|
| 1) Insulation Tape | 3) Spacers                           | 5) Barrier |
| 2) PVC tubing      | 4) Insulation sheets for transistors |            |

6. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.) wrap ends of wires securely about the terminals before soldering.

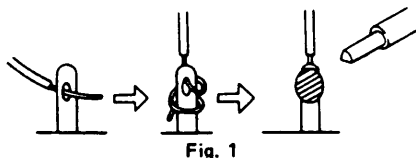


Fig. 1

7. Observe that wires do not contact heat producing parts (heat-sinks, oxide metal film resistors, fusible resistors, etc.)

8. Check that replaced wires do not contact sharp edged or pointed parts.

9. When a power cord has been replaced, check that 10–15 kg of force in any direction will not loosen it.

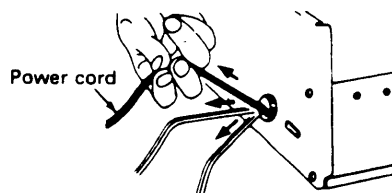


Fig. 2

10. Also check areas surrounding repaired locations.

11. Products using cathode ray tubes (CRTs)

In regard to such products, the cathode ray tubes themselves, the high voltage circuits, and related circuits are specified for compliance with recognized codes pertaining to X-ray emission. Consequently, when servicing these products, replace the cathode ray tubes and other parts with only the specified parts. Under no circumstances attempt to modify these circuits. Unauthorized modification can increase the high voltage value and cause X-ray emission from the cathode ray tube.

12. Crimp type wire connector

In such cases as when replacing the power transformer in sets where the connections between the power cord and power transformer primary lead wires are performed using crimp type connectors, if replacing the connectors is unavoidable, in order to prevent safety hazards, perform carefully and precisely according to the following steps.

1) **Connector part number :** E03830-001

2) **Required tool :** Connector crimping tool of the proper type which will not damage insulated parts.

3) **Replacement procedure**

(1) Remove the old connector by cutting the wires at a point close to the connector.

Important : Do not reuse a connector (discard it).

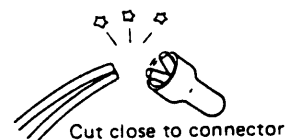


Fig. 3

(2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

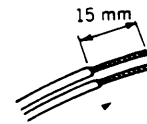


Fig. 4

(3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

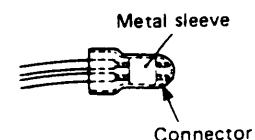


Fig. 5

(4) As shown in Fig. 6, use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

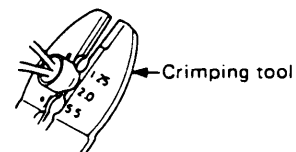


Fig. 6

(5) Check the four points noted in Fig. 7.

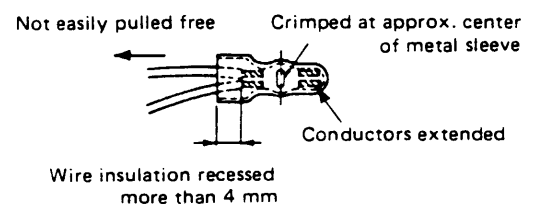


Fig. 7

## ● Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

### 1. Insulation resistance test

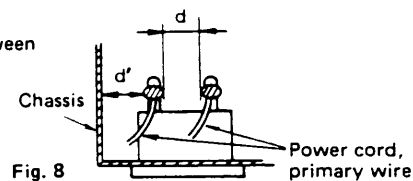
Confirm the specified insulation resistance or greater between power cord plug prongs and externally exposed parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

### 2. Dielectric strength test

Confirm specified dielectric strength or greater between power cord plug prongs and exposed accessible parts of the set (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.). See table 1 below.

### 3. Clearance distance

When replacing primary circuit components, confirm specified clearance distance (d), (d') between soldered terminals, and between terminals and surrounding metallic parts. See table 1 below.

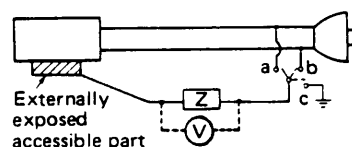


### 4. Leakage current test

Confirm specified or lower leakage current between earth ground/power cord plug prongs and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.).

**Measuring Method:** (Power ON)

Insert load Z between earth ground/power cord plug prongs and externally exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See figure 9 and following table 2.

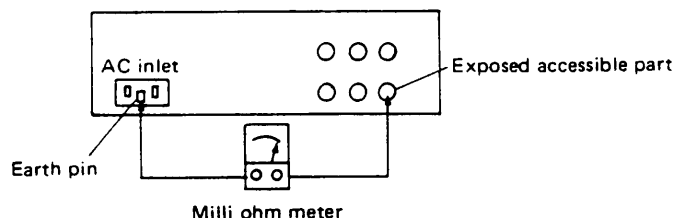


### 5. Grounding (Class I model only)

Confirm specified or lower grounding impedance between earth pin in AC inlet and externally exposed accessible parts (Video in, Video out, Audio in, Audio out or Fixing screw etc.).

**Measuring Method:**

Connect milli ohm meter between earth pin in AC inlet and exposed accessible parts. See figure 10 and grounding specifications.



#### Grounding Specifications

Region	Grounding Impedance (Z)
USA & Canada	$Z \leq 0.1 \text{ ohm}$
Europe & Australia	$Z \leq 0.5 \text{ ohm}$

Table 1 Specifications for each region

AC Line Voltage	Region	Insulation Resistance (R)	Dielectric Strength	Clearance Distance (d), (d')
100 V	Japan	$R \geq 1 \text{ M}\Omega / 500 \text{ V DC}$	AC 1 kV 1 minute	$d, d' \geq 3 \text{ mm}$
100 to 240 V			AC 1.5 kV 1 minute	$d, d' \geq 4 \text{ mm}$
110 to 130 V	USA & Canada	—	AC 900 V 1 minute	$d, d' \geq 3.2 \text{ mm}$
110 to 130 V	Europe & Australia	$R \geq 10 \text{ M}\Omega / 500 \text{ V DC}$	AC 3 kV 1 minute (Class II)	$d \geq 4 \text{ mm}$
200 to 240 V			AC 1.5 kV 1 minute (Class I)	$d' \geq 8 \text{ mm (Power cord)}$ $d' \geq 6 \text{ mm (Primary wire)}$

AC Line Voltage	Region	Load Z	Leakage Current (i)	a, b, c
100 V	Japan	$1 \text{ k}\Omega$	$i \leq 1 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	USA & Canada	$0.15 \mu\text{F}$ and $1.5 \text{ k}\Omega$	$i \leq 0.5 \text{ mA rms}$	Exposed accessible parts
110 to 130 V	Europe & Australia	$2 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Antenna earth terminals
220 to 240 V		$50 \text{ k}\Omega$	$i \leq 0.7 \text{ mA peak}$ $i \leq 2 \text{ mA dc}$	Other terminals

Table 2 Leakage current specifications for each region

**Note:** These tables are unofficial and for reference only. Be sure to confirm the precise values for your particular country and locality.



# Safety Precautions

The rating plate and the safety caution are on the rear of the unit.

**WARNING — DANGEROUS VOLTAGE INSIDE**  
**WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS UNIT TO RAIN OR MOISTURE.**

**IMPORTANT (In the United Kingdom)**  
**Mains Supply (240 V~, 50 Hz only)**

## IMPORTANT

Do not make any connection to the larger Terminal coded E or Green. The wires in the mains lead are coloured in accordance with the following code:



If these colours do not correspond with the terminal identifications of your plug, connect as follows:  
 Blue wire to terminal coded N (Neutral) or coloured Black.  
 Brown wire to terminal coded L (Live) or coloured Red.  
**If in doubt — consult a competent electrician.**

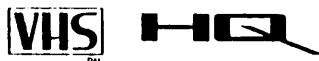
## CAUTION

- When you are not using the recorder for a long period of time, it is recommended that you disconnect the power cord from the AC outlet.
- Dangerous voltage inside. Refer internal servicing to qualified service personnel. To prevent electric shock or fire hazard, remove the power cord from the AC outlet prior to connecting or disconnecting any signal lead or aerial.

## IMPORTANT

1. In addition to PAL B/G colour television signals, this recorder can also receive SECAM B/G colour television signals. SECAM B/G colour television signals can be recorded and played back in colour as far as this same recorder is used for recording and playback.
2. SECAM B/G colour television signals recorded on this recorder produce monochrome pictures if played back on another PAL or SECAM recorder.
3. SECAM B/G colour television signals recorded on another PAL or SECAM recorder produce monochrome pictures if played back on this recorder.
4. This recorder cannot be used in France. Use in France a recorder which is capable of receiving SECAM L colour television signals.
5. SECAM L prerecorded cassettes or recordings made with a SECAM L video recorder produce monochrome pictures when played back on this recorder.

**IMPORTANT:** It may be unlawful to record or play back copyrighted material without the consent of the copyright owner.



- Only cassettes marked "VHS" can be used with this video recorder.
- HQ VHS is compatible with existing VHS equipment.

COPYRIGHT © 1991 VICTOR COMPANY OF JAPAN, LTD

# Contents

Controls, Indicators, And Connectors.....	3
Getting To Know Your Video Recorder.....	5

## Getting Started With Your Video Recorder

Making The Right Connections.....	7
Handling Video Cassettes.....	8
Setting The Clock.....	9
Setting The Tuner.....	10

## Basic Operation Of Your Video Recorder

Playback.....	11
Recording.....	12
Timer-Recording.....	13

## Other Functions On Your Video Recorder

For Playback.....	15
For Recording.....	16
For Timer-Recording.....	17
For Editing.....	19

Precautions.....	20
In Case Of Difficulties.....	21
Specifications.....	23
Special Note On Head Cleaning.....	23

## How To Use This Instruction Manual

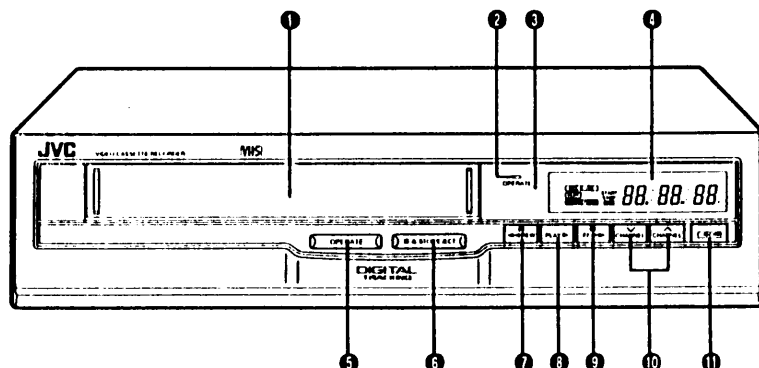
This instruction manual has been designed with both new and experienced users in mind. The first half offers detailed, step-by-step instructions for setting up your video recorder, and on using its basic functions. The second half provides instructions on the many other functions available on your video recorder. So just by following the instructions on the "Getting Started" and "Basic Operation" sections of this manual, you can master all of your recorder's basic functions, including timer-recording. Once you're sufficiently familiar with basic operation, or if you're already an experienced video user, you can move on to the additional functions introduced on the following pages.

Related features have all been clustered together for easy reference, and their categories (playback, recording, timer, etc.) are easily recognisable by the symbol appearing in the page header. If you ever need to refer to another page for instructions or information, you will be told so by a **17** mark pointing to the page number. Unless otherwise specified, operation buttons mentioned in the instructions refer to those located on the remote control, not those duplicated on the recorder.

Remember, you must use your video recorder correctly to fully enjoy it. Please use this manual effectively. It's the surest and quickest way to unlock the full potential of your new JVC video recorder.

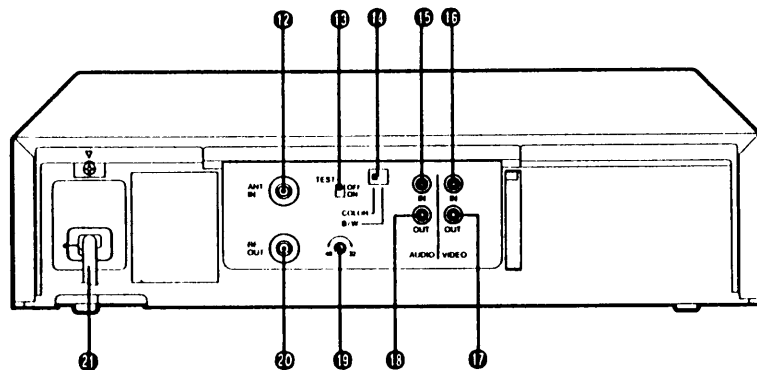
# Controls, Indicators, And Connectors

## Front Panel



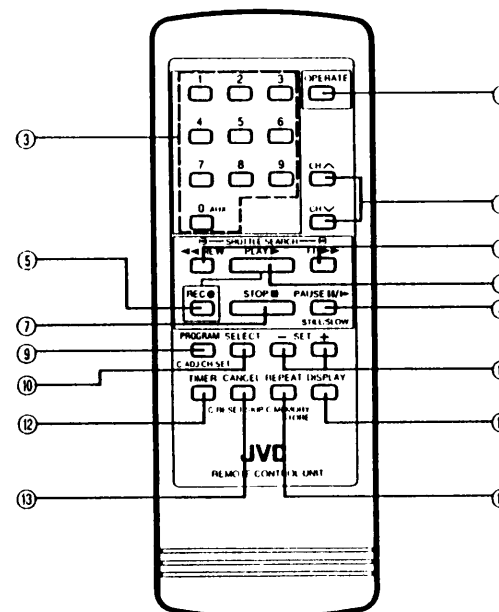
- 1 Cassette loading slot
- 2 OPERATE indicator
- 3 Infrared beam receiving window
- 4 Display panel
- 5 OPERATE button
- 6 STOP/EJECT button
- 7 REW (Rewind) button
- 8 PLAY button
- 9 FF (Fast Forward) button
- 10 CHANNEL  $\Delta/\nabla$  buttons
- 11 REC/ITR button

## Back Panel



- 12 ANT. IN terminal
- 13 TEST switch
- 14 COLOR, B/W select switch  $\rightarrow$  p.7
- 15 AUDIO IN connector
- 16 VIDEO IN connector
- 17 VIDEO OUT connector
- 18 AUDIO OUT connector
- 19 RF output channel adjustment screw  $\rightarrow$  p.7
- 20 RF OUT terminal
- 21 Power cord

## Wireless Remote Control



### Basic Operation

- 1 OPERATE button
- 2 CH  $\Delta/\nabla$  buttons
- 3 Numeric Keys

### Tape Mode Control Buttons

- 4 REW and FF (SHUTTLE SEARCH) buttons
- 5 REC button
- 6 PLAY button
- 7 STOP button
- 8 PAUSE/STILL/SLOW button

### Timer, Tuner, and Tape Counter

- 9 PROGRAM/C.ADJ./CH.SET button  $\rightarrow$  p.9,10,13,17
- 10 SELECT button  $\rightarrow$  same as above
- 11 SET  $\Delta/\nabla$  buttons  $\rightarrow$  same as above
- 12 TIMER button  $\rightarrow$  p.14
- 13 CANCEL/C. (Counter) RESET/SKIP button  $\rightarrow$  p.10,15,16, 17
- 14 DISPLAY button  $\rightarrow$  p.16
- 15 REPEAT/C. (Counter) MEMORY/STORE button  $\rightarrow$  p.10, 15, 17

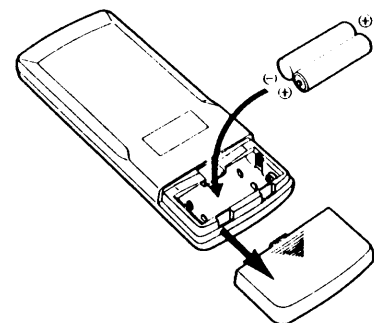
### Installing Batteries

- 1 Slide the battery compartment cover in the direction of the arrow.
- 2 Insert 2 "R03/UM-4"-size batteries (provided) in the correct directions.
- 3 Replace the cover.

### How To Use

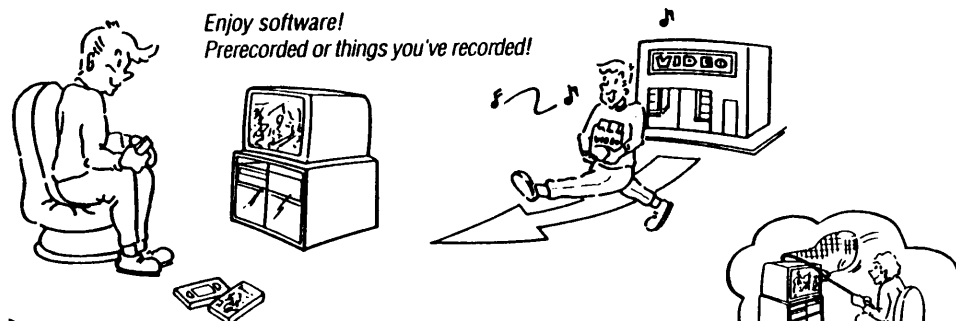
The remote control can operate most of your video recorder's functions.

- Point the remote control at the sensor window.
- The maximum operating distance of the remote control is about 8 m.



# Getting To Know Your Video Recorder

## The 3 Basic Ways Of Using Your Video Recorder



### Playback

With the video recorder properly hooked-up to your TV set, viewing videos is as easy as pushing the Play button. Prerecorded VHS software is available just about anywhere, and your video recorder will let you enjoy it all. And, of course, you can enjoy those programmes you've recorded yourself too.



Record TV programmes while you're away. Watch TV programmes when you want.



Catch a TV programme!  
With push-button ease!

### Recording

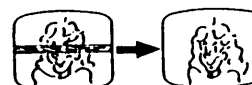
Just press the Record and Play buttons together on your remote control. The recorder will record whatever it is that you're watching. In other words, you can instantly "catch" a TV programme in progress to see it again later, show it to someone else, or keep it as part of your video library. Recording is possible for 4 hours on a single E-240 cassette.



### Timer-Recording

By using the built-in timer, you can set your video recorder to record TV programmes for you while you're asleep, while you're away, or while you're doing something else. Then you can watch those programmes later, whenever it's convenient, whenever you want. This is what's called "timeshifting", and now you can do it the JVC way.

## Some Other Functions On Your Video Recorder



### Digital Tracking

Automatically controls video tracking to maintain the best video picture, even with tapes with excessive tracking variations. A must for rental software viewing.

### Slow Motion, Still Playback, and Frame Advance

Slows or stops the action so you can follow fast or exciting segments more closely and not miss a detail.



### Realtime Tape Counter

Counts the tape in hours, minutes, and seconds rather than in numbers to make finding tape segments manually quick and easy.

### Counter Memory Function

Returns to the counter reading of "0:00:00" to conveniently find a specific place on the tape automatically.



### 1-Year/8-Event Timer

Records up to 8 of your favourite television shows, movies, or sporting events while you are away from home for up to a year, or overnight while you are busy sleeping.

### Instant Timer Recording (Off Timer)

Once recording is started, this function automatically stops recording after a preset length of time up to 4 hours and 59 minutes, freeing you to do other things.

# Making The Right Connections

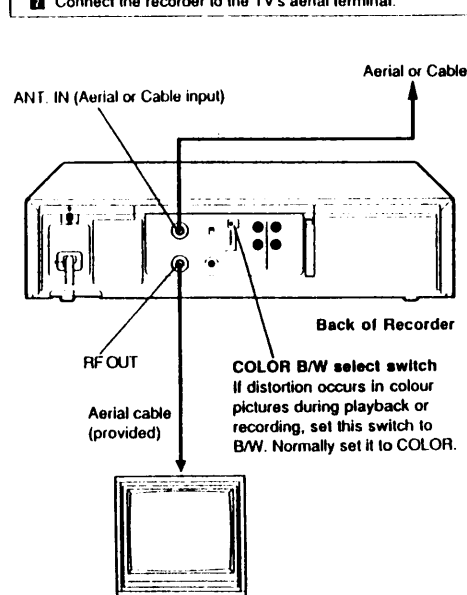
It's essential that your video recorder be properly hooked up for proper results. Follow these steps carefully. THESE STEPS MUST BE COMPLETED BEFORE ANY VIDEO OPERATION CAN BE PERFORMED.

## A RECORDER-TO-TV CONNECTION

### RF CONNECTION

For TV sets without AV input terminals:

- 1 Connect the TV aerial cable to the recorder.
- 2 Connect the recorder to the TV's aerial terminal.



## B ADJUST VIDEO CHANNEL (UHF 36)

With an RF connection, the video recorder sends picture and sound signals through the connecting cable to your TV on UHF channel 36. Fine-adjust the RF converter to match your TV.

### Test Signal

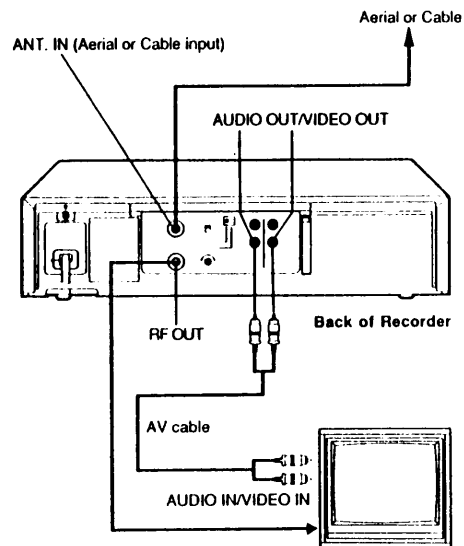
- 1 Turn on the recorder.
- 2 Set the TEST switch to ON.
- 3 Set your TV to UHF channel 36 and fine-adjust it until you bring in the two vertical white bars on the screen most clearly.
- 4 Reset the TEST switch to OFF.



### AV CONNECTION

For TV sets with AV input terminals:

- 1 Connect the aerial, recorder and TV as per "RF CONNECTION".
- 2 Connect the recorder to the TV's AV-IN terminals.



### NOTE:

If some interference noise is seen on the screen because of broadcasts on neighbouring channels, it is necessary to shift the video channel from UHF channel 36. This is possible for UHF channels 32 through 40. Consult your JVC dealer about making this adjustment.

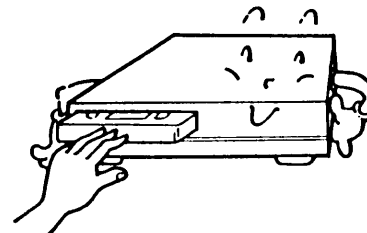
### IMPORTANT:

To operate the recorder with your TV using an RF connection, it is always necessary to set your TV's channel to UHF channel 36 (or adjusted channel). With an AV connection, set the TV to the VIDEO (or AV) mode.

# Handling Video Cassettes

## A LOADING A CASSETTE

- 1 Insert a cassette with its label side facing you.
  - If the cassette is not loaded firmly it will be ejected.
  - The counter resets automatically when a cassette is inserted.



## B UNLOADING A CASSETTE

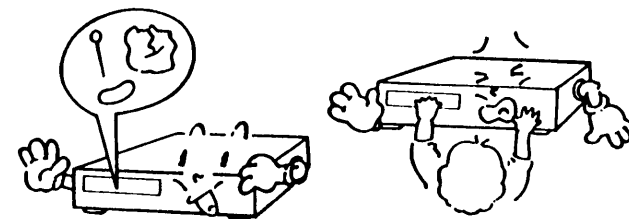
- 1 Press EJECT.
  - If the cassette will not eject, check to see if "TIMER" is lit on the display panel. If it is, press the TIMER button to turn it off.

### NOTES:

- Be sure to insert the cassette firmly into the slot; otherwise it will be automatically ejected.
- The automatic loading mechanism will operate only when the cassette is inserted correctly.

### WARNING

- Do not insert fingers or foreign objects into the cassette loading slot since this could lead to injury or damage to the mechanism. Be especially careful with children.
- Do not try to pull out a cassette once automatic loading has started.



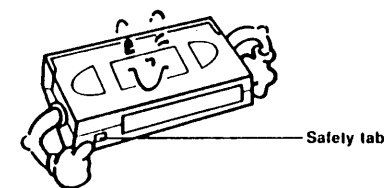
## Usable Cassettes And Their Recording Times

This video recorder can record on regular VHS and Super VHS cassettes. However, it will record and play back regular VHS video signals only. It is not possible to play back a recorded Super VHS tape.

Type of Cassette	Recording/Playback Time
E-30	30 minutes
E-60	1 hour
E-90	1 hour, 30 minutes
E-120	2 hours
E-180	3 hours
E-240	4 hours

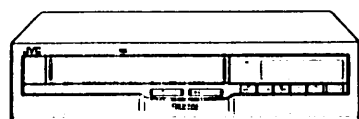
## Accidental Erasure Prevention

To prevent accidental recording on a recorded cassette, remove its safety tab. To record on it later, cover the hole with adhesive tape.

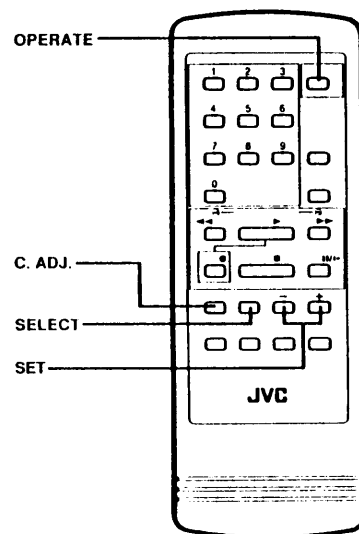


# Setting The Clock

Since your video recorder bases all of its timer recording start and stop "decisions" on the time kept by its built-in clock, accurate setting of this clock is crucial for proper timer-recording results. Use the remote control to set the clock, while referring to the recorder's display panel.



PLUG IN RECORDER



**A ACCESS THE CLOCK**

- 1 Press C. ADJ.

**B INPUT THE TIME**

- 2 Press SET to set the hour.
- 3 Press SELECT.
- 4 Repeat 2 and 3 to set the minute.

**C INPUT THE DAY, MONTH, AND YEAR**

- 5 Press SET to set the day.
- 6 Press SELECT.
- 7 Repeat 5 and 6 to set the month and year.

**D START THE CLOCK**

- 8 Press C. ADJ.

**POWER FAILURE INDICATOR**

- The clock resets to "0:00" and starts blinking when there has been a power failure. Reset the time to return the clock display to normal.

**TO MAKE CORRECTION**

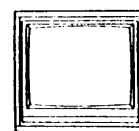
Advance with SELECT to the item you wish to change and input new data with SET.

## NOTES:

- If the day and month data is invalid (such as 31st April), the month digits are cleared automatically and the day digits will blink. Input again.
- If you are only adjusting the time, the Timer Program mode will be engaged first in step 1. So press C. ADJ. again.

# Setting The Tuner

The procedure introduced here lets you assign receivable channels in your area to channel positions on your recorder's tuner. Once stored, these can be accessed with the CHANNEL  $\wedge/\vee$  buttons. During channel scanning, empty tuner channel positions will be skipped so you won't have to go through any "blank" channels to get to the one you want.



POWER ON;  
SELECT CHANNEL  
UHF 36 (OR AV MODE)

OPERATE

CH

SET

SELECT

CH. SET

STORE

SKIP

**A TURN ON THE RECORDER**

- 1 Press OPERATE.

**B ACCESS THE TUNER**

- 2 Press CH.SET until the channel position number indication appears.

Means channel position 1 is empty.

**C SELECT THE BAND**

- 3 Press SELECT.
- 4 Press SET to select "1", "3", or "U".

"1", "3" : VHF band  
"U" : UHF band

Band indicator

Tuning voltage giving a rough reference of where tuning is being performed in the corresponding band.

**D SEARCH FOR RECEIVABLE CHANNELS**

- 5 Press SELECT.
- 6 Keep SET pressed for a few seconds until automatic scanning starts.

Tuning voltage indicator will count down or up.

- When a broadcast is detected, automatic scanning stops.

**E SELECT A CHANNEL POSITION**

- 7 Press SELECT.
- 8 Press SET to select the tuner channel position where you wish to store that broadcast.

**F STORE THE CHANNEL**

- 9 Press STORE.

The band and tuning voltage corresponding to the stored broadcast is displayed.

**G CONTINUE**

- 10 Repeat steps 4 through 9 for other receivable broadcasts.

**H TO CANCEL CHANNEL SET MODE**

- 11 Press CH.SET.

**TO SKIP STORED CHANNELS**

- 1 Specify the channel to be skipped using the CH buttons or numeric keys.
- 2 Press CH.SET until the channel position number indication appears.
- 3 Press SKIP.
- 4 Press CH.SET to cancel the Channel Set mode.

## NOTE:

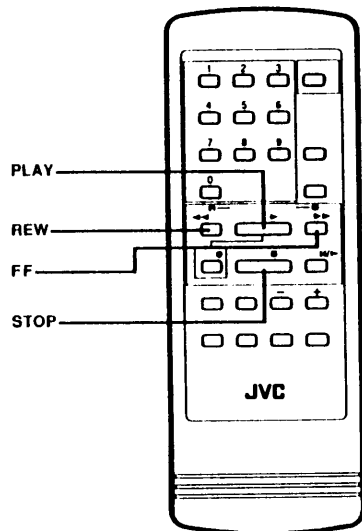
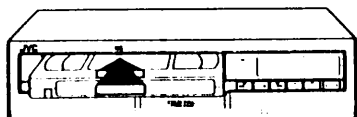
If you don't want to store the broadcast detected in step 6, simply press SET and hold for a few seconds to continue automatic scanning

# ▶ Playback

The easiest, most basic operation possible with your video recorder is tape playback. Already-recorded signals on a video tape are read by your video recorder and displayed on your TV just like a TV programme.



POWER ON;  
SELECT CHANNEL  
UHF 36 (OR AV MODE)



## A LOAD A CASSETTE

- 1 Insert a cassette.
  - The recorder power will come on automatically.
  - If the safety tab on the cassette is removed, playback will start automatically.

## B TO START PLAYBACK

- 1 Press PLAY.

## C TO STOP PLAYBACK

- 1 Press STOP.

## D TO REWIND OR FAST-FORWARD

- 1 Press REW to rewind the tape.
- 1 Press FF to fast-forward the tape.
  - Press STOP to stop rewind or fast-forward.

## E TO EJECT THE TAPE

- 1 Press STOP/EJECT on the recorder.

### NOTES:

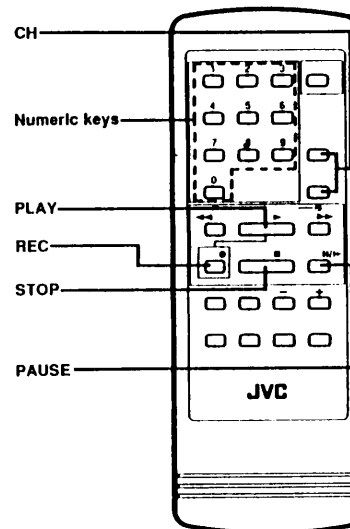
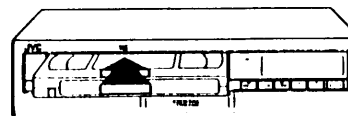
- If the end of the tape is reached during Play or search, it is automatically rewound to the beginning and stops.
- If noise bars appear during playback, correct using manual tracking. *see* p.15.

# ● Recording

TV signals being received by the recorder's built-in tuner can be recorded onto a video tape. This is realtime video recording.



POWER ON;  
SELECT CHANNEL  
UHF 36 (OR AV MODE)



## A LOAD A CASSETTE

- 1 Insert a cassette with the safety tab in place.
  - The recorder power will come on automatically.

## B CHOOSE A PROGRAMME

- 1 Press CH or the numeric keys to select the channel you wish to record.

## C TO START RECORDING

- 1 Press REC and PLAY simultaneously.

## D TO PAUSE RECORDING

- 1 Press PAUSE.
- 1 Press PLAY to resume recording.

## E TO STOP RECORDING

- 1 Press STOP.

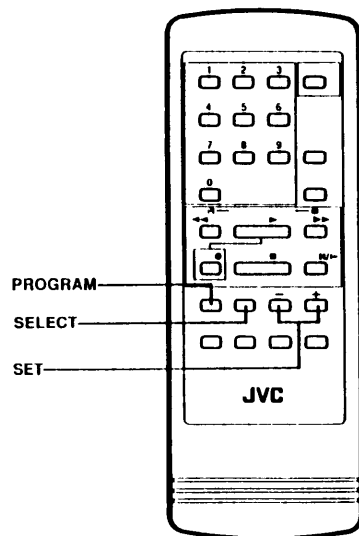
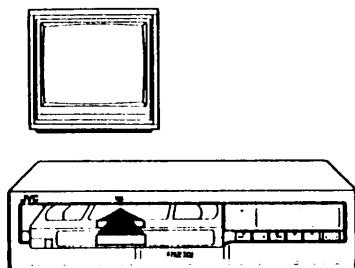
### NOTES:

- To start recording with the recorder's REC/ITR button, press it once on its own. Pressing REC/ITR more than once activates the Off-Timer. *see* p.16.
- After pause, when recording is resumed, a few frames recorded before the pause may be overlapped by the new recording. This is meant to reduce picture distortion and is not a malfunction.
- The recorder automatically stops when record-pause continues for more than 5 minutes.
- If the REC button does not work, check to see if the cassette's safety tab has been removed.
- The channel cannot be changed while recording is in progress. To change the channel, engage the record-pause mode, then change the channel.
- The recorder automatically rewinds when the end of the tape is reached during recording.

# Timer-Recording

Timer-recording is one of the most useful functions of your video recorder, and, if you don't understand it, it can be one of the most complicated too. Please read the following to get a clear idea about how to program the timer.

The built-in 1-year/8-event programmable timer can be set with the remote control while referring to the recorder's display panel. Make sure that the display panel shows the correct current time.



## A LOAD A CASSETTE

- 1 Insert a cassette with the safety tab in place.
  - The recorder power will come on automatically.

## B ACCESS THE TIMER PROGRAM

- 2 Press PROGRAM.
  - You are ready to input data into Program No. 1.
  - To change the program number, press SET.

P : 1

## C INPUT THE DATE

- 3 Press SELECT, and then SET to set the day.
- 4 Press SELECT, and then SET to set the month.

25. 12.

## D INPUT THE START TIME

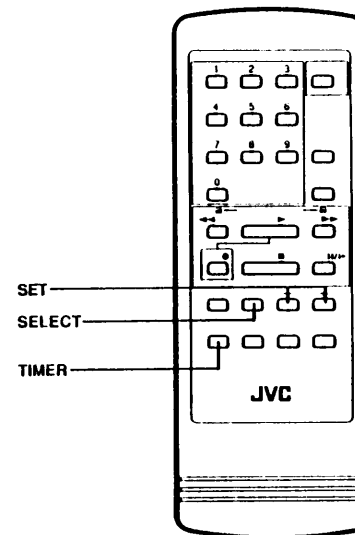
- 5 Press SELECT, and then SET to set the hour.
- 6 Press SELECT, and then SET to set the minute.

START 12:30

## E INPUT THE STOP TIME

- 7 Repeat 5 and 6.

STOP 13:30



## F INPUT THE CHANNEL NUMBER

- 8 Press SELECT, and then SET to set the channel.

Ch 8

## G END ONE PROGRAM

- 9 Press SELECT.

P : 1

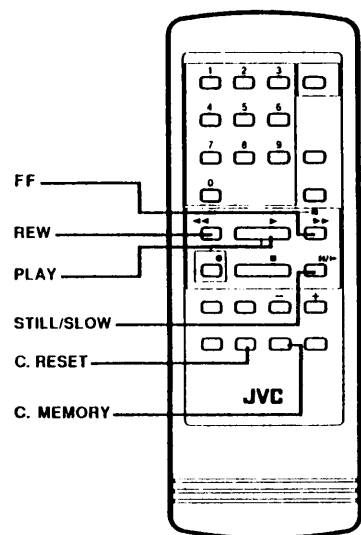
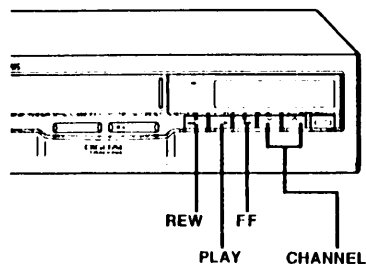
- The current program number will appear and blink.
- To make corrections, advance with SELECT to the item you wish to change and input new data with SET.
- If you need to set another program, press SET and repeat steps 3 through 9.

## H SET TO TIMER MODE

- 10 Press TIMER.
  - The recorder will enter the timer mode and power will go off.
  - Press TIMER again to release the timer mode.

For other timer-programming methods and error indications, see p.17, 18.

# ▶ For Playback



## NOTES:

- The recorder automatically stops when still continues for more than 5 minutes.
- If the still picture is unstable, use the recorder's CHANNEL  $\wedge/\vee$  buttons to correct the picture.
- During search playback, some noise bars will appear.
- There is no audio during search, slow, still, or frame-by-frame playback.
- When a new tape is inserted, the recorder enters the automatic tracking mode automatically.

## High-Speed Forward And Reverse Search

### During Playback:

- 1 Press FF for high-speed forward search.
- 2 Press REW for high-speed reverse search.
- 3 Press PLAY to resume normal playback.
  - For short searches, keep FF or REW pressed for more than 2 seconds. When released, normal playback will continue.

## Still Playback And Frame Advance

### During Playback:

- 1 Press STILL to view a still picture.
- 2 Press again to advance the picture frame by frame.
- 3 Press PLAY to resume normal playback.

## Slow Motion

You can view pictures in slow motion in the forward direction using the SLOW button.

### During Playback:

- 1 Press SLOW for two seconds. Tape will play back in slow motion.
  - Press PLAY to resume normal playback.

## Manual Tracking

Your video recorder is equipped with automatic tracking control. If you wish to adjust tracking manually, you can override this function.

### During Playback:

- 1 Press the recorder's CHANNEL  $\wedge/\vee$  buttons simultaneously to cancel auto tracking.

- 2 Press CHANNEL  $\wedge$  or  $\vee$  to adjust tracking.

### During Slow:

- 1 Simply press CHANNEL  $\wedge$  or  $\vee$  to adjust tracking.

### During Still:

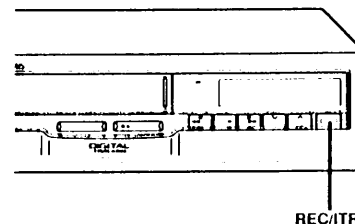
- 1 Press STILL a few more times to remove the noise bars from the screen.

## Counter Memory

### During Play or Stop:

- 1 Press C. RESET at a point you wish to locate later.
  - The counter will read "0:00:00".
- 2 Press C. MEMORY.
  - The "M" indicator will light on the display panel.
- 3 Press REW (or FF) when you wish to return to that point.
  - The tape will rewind (or fast forward) and stop at about "0:00:00" automatically.
- 4 To cancel the Counter Memory mode, press C. MEMORY again.

# ● For Recording



## To Watch Another Programme While Recording

### During Record:

- 1 Use the channel controls on the TV to select the other channel you wish to view.
  - The programme selected with the TV's channel controls will appear on the TV screen while the one selected with the video recorder's channel controls will be recorded on the tape.

## Instant Timer Recording (Off Timer)

You can start a recording and then set the recorder to shut off automatically after a set duration.

### During Record:

- 1 Press REC/ITR. "ITR" and "0:30" indications appear, advising that power will switch off after 30 minutes.
- 2 Press REC/ITR again to delay the off-time by 30 minute increments (up to 4 hours).
  - For more precise setting, use the remote control's SELECT and SET buttons to set the exact time required (possible up to 4 hours and 59 minutes).

## Elapsed Recording Time Indication

When you need to know the exact time of a recording.

- 1 Press C. RESET before starting recording or playback.
  - The counter will be reset to "0:00:00" and show the exact elapsed time as the tape runs.

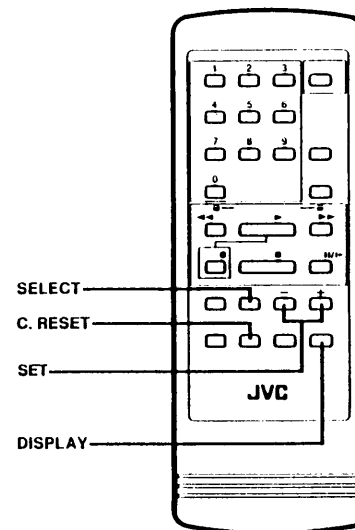
## Display Button

When you wish to check the time, date, or channel number during recording. (The counter reading is normally displayed during recording.)

- 1 Press DISPLAY to display the current clock time.
- 2 Press DISPLAY again to display the current date.
- 3 Press DISPLAY again to display the channel number.

## NOTE:

- The DISPLAY button rotates between channel, tape counter, clock time, and date.

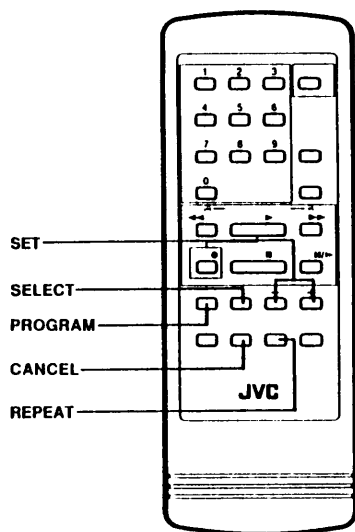






# For Timer Recording

In addition to one-time-only timer-recording of individual programmes, your video recorder offers several other timer-recording options. Please read the following carefully to find out how to use all timer-recording options and what to do if things don't work out the way you expected.



## Weekly Program

This function lets you set the recorder to timer-record at the same time on the same day every week. Use it to record weekly serials.

- 1 Press REPEAT whenever the memory program is open (except when the program number is displayed).
  - The "W" indicator will light.

25. 12.

## Daily Program

This function lets you set the recorder to timer-record at the same time everyday. Use it to record daily serials.

- 1 Press REPEAT twice whenever the memory program is open (except when the program number is displayed).
  - The "D" indicator will light.

25. 12.

## NOTE:

The REPEAT button rotates between "W", "D", and off.

## On Checking And Cancelling Programs

Since executed programs are automatically cleared from memory (except those for daily and weekly serials), cases where the entire 8-event memory is full should be rare. If this should happen, check the preset programs and cancel one or more to make room for the new program(s) you wish to input.

### TO CANCEL A PROGRAM

- 1 Press PROGRAM.
  - Program 1 is displayed with the number blinking.
- 2 Press SELECT to review the program contents in succession.
- 3 Press CANCEL to erase the program from memory.
  - You can press CANCEL at any stage while the program is open. The erased program number will be displayed with the number blinking.
  - To erase another program, press SET when a blinking program number is displayed.

## Some Facts On Timer Operation

- When timer-recording is successfully completed, the recorder's power is automatically switched off.
- Since the timer starts and stops recording based on the time being kept by your video recorder's built-in clock, the clock's time must be accurate for correct timer-recording results.

## Error Indications

The following error indications may appear on the recorder when you press the TIMER button to engage the Timer Standby mode. Here's why, and what you should do.

- "TIMER" and "00" on the display panel continue blinking.
 

**WHY:** There is no cassette in the recorder.

**WHAT TO DO:** Insert a cassette. Press TIMER again.
- The cassette is automatically ejected. "TIMER" and "00" continue blinking.
 

**WHY:** The inserted cassette has its safety tab removed.

**WHAT TO DO:** Insert a cassette with its safety tab intact. Or cover the safety tab hole of the cassette with adhesive tape and re-insert it. Press TIMER again. *17p.8.*
- "TIMER" blinks for 10 seconds and the Timer Standby mode is cancelled.
 

**WHY:** There are no preset programs in memory, or they have all been incorrectly preset.

**WHAT TO DO:** Check the programmed data and re-program it as necessary. Press TIMER again.

## Other Indications

- "TIMER" steady lit (with clock display).
 

**WHY:** The recorder is in the Timer Standby mode. This is the normal display you should see when you press the TIMER button.
- "REC" and "TIMER" steady lit.
 

**WHY:** Normal display while timer-recording is in progress.
- The cassette was ejected, with power off and "TIMER" blinking.
 

**WHY:** This means that the end of the tape was reached while timer-recording was in progress. Therefore, the preset program may not be recorded in its entirety.

- "0.00" blinking.
 

**WHY:** This means the clock must be set. It's displayed when time-keeping is terminated due to a power failure or because the recorder's power plug was pulled from the AC outlet.

**WHAT TO DO:** Set the clock. *17p.9.*
- If power was interrupted, it's also likely that all preset timer programming data has been erased. Please check and re-program as necessary.

## Locking The Recorder's Controls

To avoid unwanted operation and prevent accidental recording or other interference, use the Child Lock function.

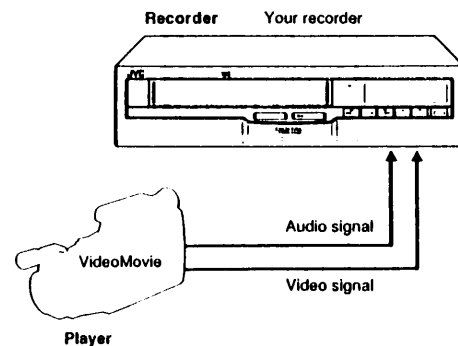
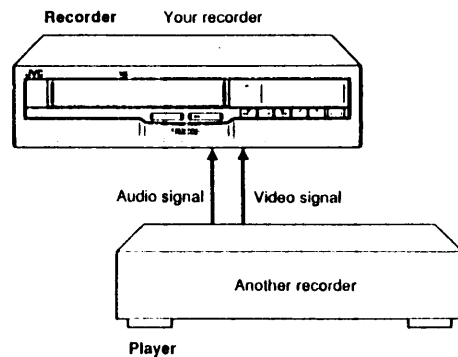
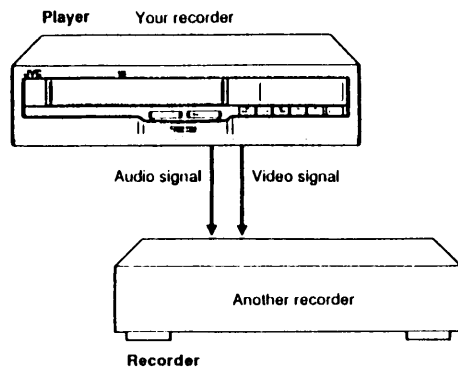
- 1 Press the remote control's OPERATE button to turn the recorder's power off. Keep this button pressed for about 2 more seconds after the power LED indicator has gone off.
  - The Child Lock indicator (-) will appear in the channel display section on the display panel.

12:30 -

- 2 Child Lock is automatically deactivated when you switch the recorder's power on again with the remote's OPERATE button.
  - Pressing the TIMER button during timer-recording also deactivates the Child Lock mode.

## NOTES:

- While the Child Lock mode is engaged, make sure you keep your remote control in a safe place inaccessible to children.
- Timer-recording is possible in the Child Lock mode. After timer-recording has been performed, the Child Lock mode remains in effect.



## Editing To/From Another Video Recorder

Your video recorder can be used as either the recording deck or the source player when editing tapes.

### PREPARATION

- 1 Connect the player's VIDEO OUT and AUDIO OUT connectors to the recorder's VIDEO IN and AUDIO IN connectors.

### OPERATION

- 2 Set the recorder's input mode to AUX.
  - With this recorder, press the numeric key "0". "AU" will appear instead of a channel number.
- 3 Put the player in the Play mode.
- 4 Put the recorder in the Record mode.

## Editing From A VideoMovie

Tape-to-tape editing is also possible using a VideoMovie (equipped with playback facility) as the player and your deck as the recorder.

### PREPARATION

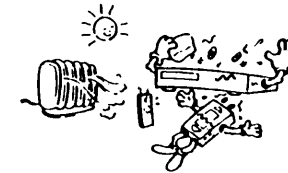
- 1 Connect the VideoMovie's AV OUT connector to the recorder's VIDEO IN and AUDIO IN connectors.
  - If the VideoMovie's AV output cable includes a mini-plug, leave it unconnected.

### OPERATION

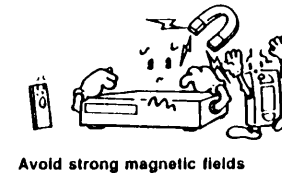
- 2 Set the recorder's input mode to AUX by pressing numeric key "0". "AU" will appear instead of a channel number.
- 3 Put the VideoMovie in the Play mode.
- 4 Put the recorder in the Record mode.

# Precautions

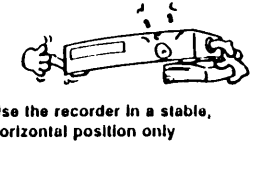
## Recorder, Remote Control, And Cassette Care



Avoid extreme heat and direct sunlight



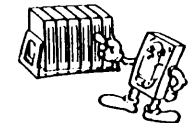
Avoid strong magnetic fields



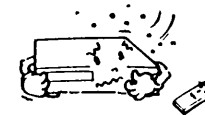
Use the recorder in a stable, horizontal position only



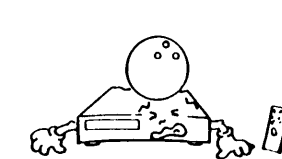
Do not block the recorder's ventilation openings



Place cassettes in cassette cases and store vertically



Avoid extreme cold



Do not place anything heavy on the recorder or remote control



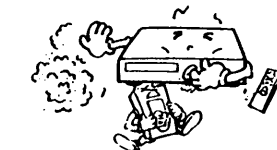
**Beware of moisture condensation**  
Moisture in the air will condense on the recorder when you move it from a cold place to a warm place, or under extremely humid conditions — just as water droplets form on the surface of a glass filled with cold liquid. Moisture condensation on the head drum will cause damage to the tape. In conditions where condensation may occur, keep the recorder's power turned on for a few hours to let the moisture dry.



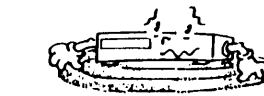
Avoid extreme humidity



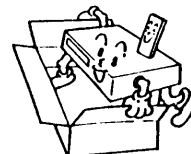
Do not place anything which might spill on top of the recorder or remote control



Avoid dust



Do not place the recorder on cushions, pillows, or thick carpeting



**When transporting**  
■ Be sure to remove cassette from recorder before packing.  
■ Avoid violent shocks to the recorder during packing and transport

# In Case Of Difficulties

## POWER AND TAPE TRANSPORT PROBLEMS

Symptoms	Check points
No power is applied to the recorder.	<ul style="list-style-type: none"> <li>■ Is the power cord disconnected? — Connect it.</li> </ul>
Clock is functioning properly, but the recorder cannot be powered. Tape does not run during recording.	<ul style="list-style-type: none"> <li>■ Is "TIMER" displayed on the display panel? — Press the TIMER button to extinguish the display.</li> <li>■ Is the PAUSE button engaged? — Press the PLAY button.</li> </ul>
Tape stops during rewind or fast-forward.	<ul style="list-style-type: none"> <li>■ Is the C. MEMORY button pressed? — Press again to make "M" disappear from the display panel.</li> </ul>
Tape will not rewind or fast-forward.	<ul style="list-style-type: none"> <li>■ Is the tape already fully rewound or fast-forwarded? — Check the cassette.</li> </ul>

## RECORDING PROBLEMS

Symptoms	Check points
Recording cannot be started.	<ul style="list-style-type: none"> <li>■ Is a cassette loaded?</li> <li>■ Is the safety tab on the cassette removed? — Reseal the slot with adhesive tape.</li> </ul>
TV broadcasts cannot be recorded.	<ul style="list-style-type: none"> <li>■ Has "AU" been selected? — Set to the desired channel.</li> </ul>
Tape-to-tape editing is not possible	<ul style="list-style-type: none"> <li>■ Is the VideoMovie or another video recorder correctly connected?</li> <li>■ Are all necessary power switches turned ON?</li> <li>■ Has "AU" been selected? — Set to "AU".</li> </ul>
Camera recording is not possible.	<ul style="list-style-type: none"> <li>■ Is the VideoMovie correctly connected?</li> <li>■ Has "AU" been selected? — Set to "AU".</li> </ul>
Timer recording is not possible.	<ul style="list-style-type: none"> <li>■ Have you set the clock correctly and programmed the timer correctly? — Check once again.</li> <li>■ Is "TIMER" displayed on the display panel? — If not, press the TIMER button to display "TIMER".</li> </ul>

## PLAYBACK PROBLEMS

Symptoms	Check points
Playback picture does not appear while the tape is running.	<ul style="list-style-type: none"> <li>■ If you are using RF OUT connection, is the TV receiver's channel selector set to the correct video channel? — Set it to the RF converter channel (UHF 36) (p.7)</li> <li>■ If you are using AV connection, is the TV receiver set to the AV mode? — Set it to the AV mode.</li> </ul>
Noise appears during visual search.	<ul style="list-style-type: none"> <li>■ This is normal.</li> </ul>
Noise appears during normal playback.	<ul style="list-style-type: none"> <li>■ Is the automatic tracking mode engaged? — Try manual tracking. (p.15)</li> </ul>
Noise appears during slow and still playback.	<ul style="list-style-type: none"> <li>■ Is the automatic tracking mode engaged? — Try manual tracking. (p.15)</li> </ul>
Playback picture is blurred or interrupted while TV broadcasts are clear.	<ul style="list-style-type: none"> <li>■ Video heads may be dirty. — Head cleaning is necessary. Consult your JVC dealer. (p.23)</li> </ul>

## OTHERS

Symptoms	Check points
Whistling or howling is heard from TV during camera recording.	<ul style="list-style-type: none"> <li>■ Move VideoMovie or camera's microphone away from TV or reduce TV sound volume.</li> </ul>
Clock setting is not possible.	<ul style="list-style-type: none"> <li>■ Is "TIMER" displayed on the display panel? — Press the TIMER button to extinguish the display.</li> </ul>
Some channels are skipped over when scanning channels.	<ul style="list-style-type: none"> <li>■ Those channels are preset to be skipped over. If you need them, restore them. (p.10)</li> </ul>
Channel cannot be switched.	<ul style="list-style-type: none"> <li>■ Is recording in progress? — Press the PAUSE button, change the channel, and press the PLAY button.</li> </ul>
Remote control does not function.	<ul style="list-style-type: none"> <li>■ Are the batteries discharged? — Replace with new ones.</li> </ul>

## ATTENTION:

This recorder contains microcomputers. External electronic noise or interference could cause malfunctioning. In such cases, switch the power off and unplug the power cord. Then plug it in again and switch on. Take out the cassette. After checking the cassette, operate the unit as usual.

# SECTION 1

## DISASSEMBLY AND MECHANISM ADJUSTMENTS

### 1.1 DISASSEMBLY

#### 1.1.1 Top cover

1. Refer to Fig. 1-1-1 and set for the EJECT (Stop) mode and disconnect VCR from AC power.
2. Take out 5 screws (A). To remove the top cover, slide in direction of arrow and lift it away.

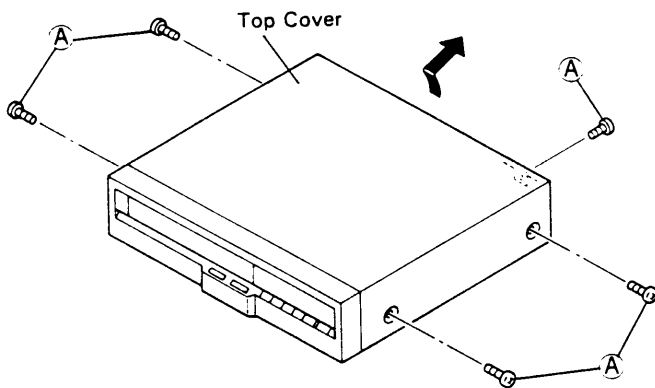


Fig. 1-1-1

#### 1.1.3 Bottom cover

1. Remove the top cover.
2. Refer to Fig. 1-1-3 and take out 3 screws (D) and disengage 4 claws (E) from the bottom of the chassis.
3. Disengage the bottom cover from the bottom of the chassis slide in direction of arrow and disengage 2 tabs (F).

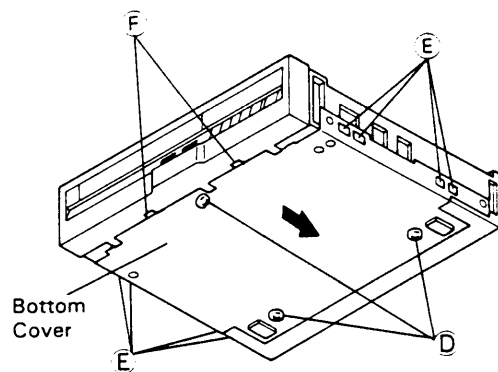


Fig. 1-1-3

#### 1.1.2 Front panel assembly

1. Remove the top cover.
2. Carefully disengage 3 tabs (B) of the front panel assembly from the upper side of the chassis.
3. Refer to Fig. 1-1-2 and pull the front panel assembly forward you to disengage 3 tabs (C) of the front panel assembly from the bottom side of the chassis, then remove the front panel assembly.

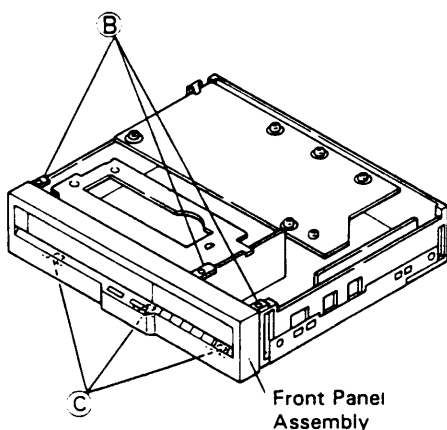


Fig. 1-1-2

#### 1.1.4 Main board assembly

1. Remove the top cover.
2. Refer to Fig. 1-1-4 and take out 4 screws (G) and 1 claw (H) from main board assembly.
3. Remove the main board assembly in the upward direction.

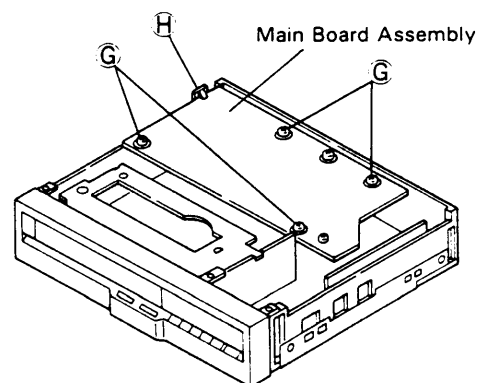


Fig. 1-1-4

### 1.1.5 Cassette housing

1. Remove the top cover and main board assembly.
2. Refer to Figs. 1-1-5 and 1-1-6.  
Take out 4 screws (J) that secure the cassette housing. Disengage 3 tabs (K) of the front panel and pull the front panel forward where it does not interfere with removing the cassette housing.
3. Remove the cassette housing in the upward direction.

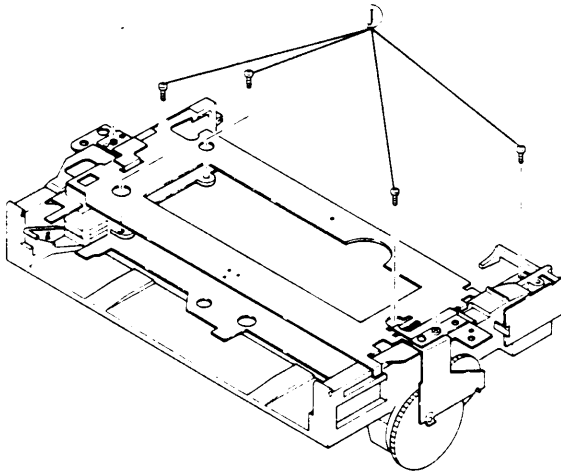


Fig. 1-1-5

### 4. Pre/Rec board assembly

- 1) Remove the top cover and main board assembly.
- 2) Refer to Fig. 1-1-6 take out 2 screws (L) and remove the drum shield.

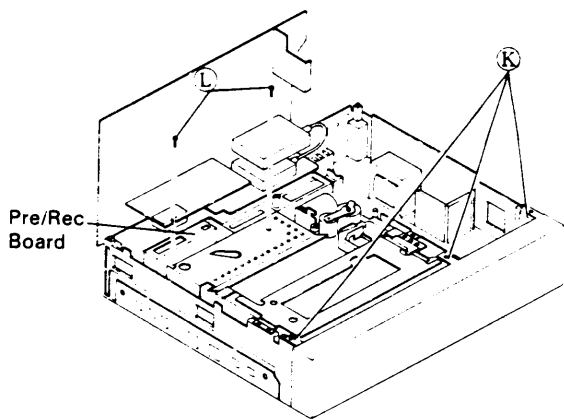


Fig. 1-1-6

### 1.1.6 Cassette housing installation

1. On the main deck, observe the positional relationships of the parts indicated in Fig. 1-1-7.  
If necessary, turn the loading motor by hand to obtain these positions.

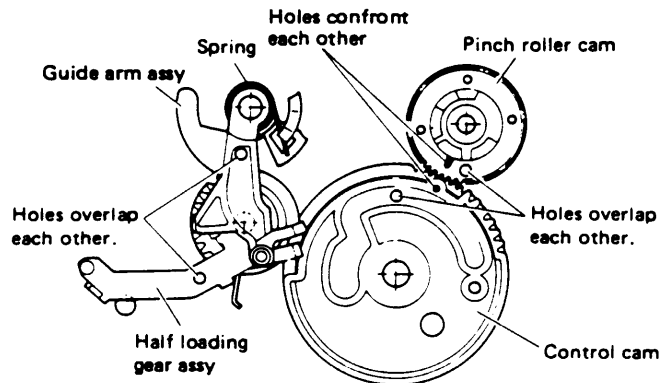


Fig. 1-1-7

2. Refer to Fig. 1-1-8 and confirm that the clutch is engaged.  
If necessary, press the lever indicated by the arrow to where the clutch is locked.

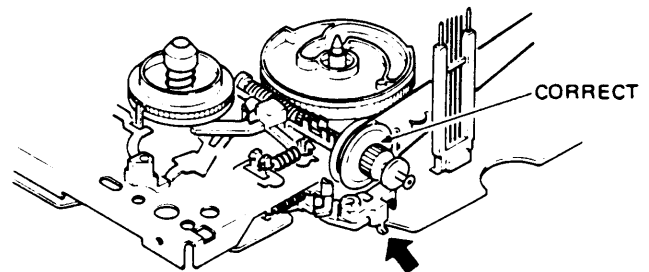


Fig. 1-1-8

3. Check that the cassette housing is in the eject state (internal holder of the cassette housing is locked in raised position).  
Set the cassette housing into place and secure with 4 screws.
4. Install the front panel as shown in Fig. 1-1-9 and re-engage the tabs. Supply power and use a spare cassette to check for normal loading and eject operations.

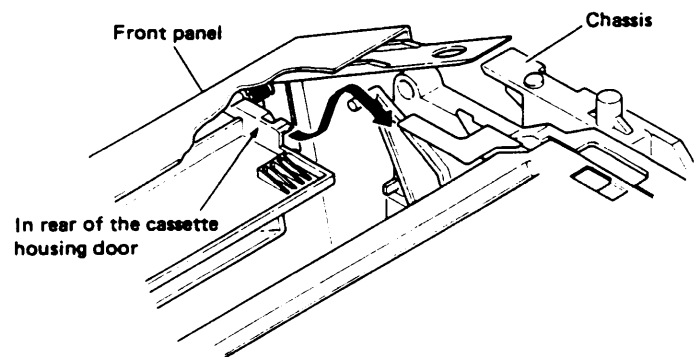


Fig. 1-1-9

5. Disconnect VCR from power, then reinstall the main board assembly and top cover.

### 1.1.7 Cassette housing door

1. Remove the top cover and front panel assembly.
2. Refer to Fig. 1-1-10, with a lift of cassette housing door by hand, bend center of the cassette housing door toward you, then pull out the left end from the cassette housing.
3. Refer to Fig. 1-1-10 and use care regarding the torsion spring, then pull out the right end of the cassette housing door to move it.

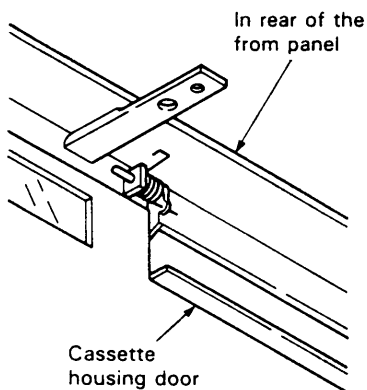


Fig. 1-1-10

### 1.1.9 Switching regulator board assembly

1. Remove the top cover.
2. Refer to Fig. 1-1-12 and take out 2 screws (N) from the switching regulator board assembly.
3. Remove the switching regulator board assembly in the upward direction.

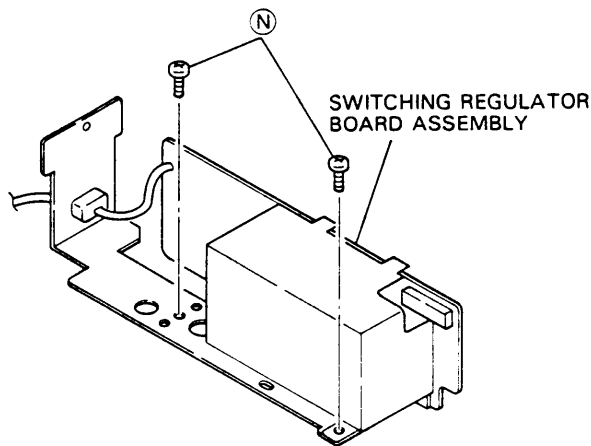


Fig. 1-1-12

### 1.1.8 Main-deck

1. Remove the top cover, front panel assembly and main board assembly.
2. Refer to Fig. 1-1-11 and take out 3 screws (M) from the main-deck assembly.
3. Remove the main-deck assembly in the upward direction and disconnect a connector CN1 from the DECK TERMINAL board, connectors CN701, CN703 from the Pre/Rec board, connector CN1 from the A/C head board, connector CN1 from the Loading MDA board and connector CN1 from the Drum MDA board.

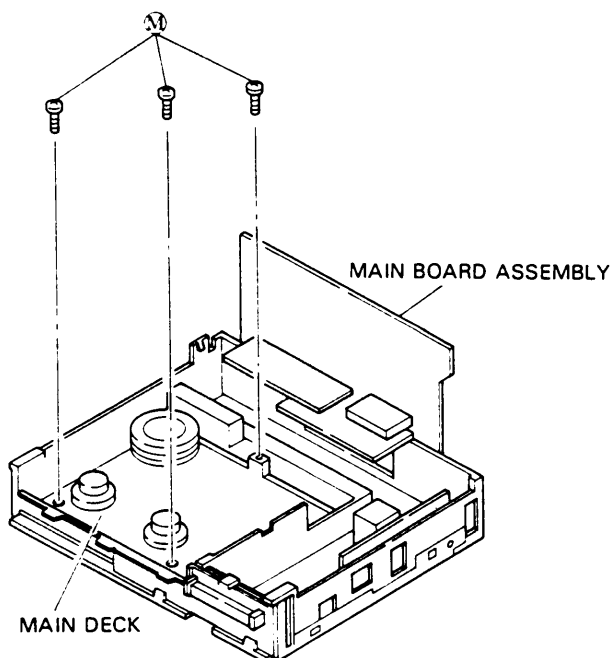


Fig. 1-1-11

1.2 MECHANISM ADJUSTMENTS

1.2.1 Precautions

- 1. Disconnect mainframe from AC power before soldering.
- 2. Avoid imparting stress to wires when disengaging connectors.
- 3. Determine and correct the cause of difficulty before proceeding to adjustments. Do not disturb settings unnecessarily.
- 4. Use care not to damage tabs, claws, etc. during repairs.
- 5. Install the cassette housing assembly only when the mechanism is in the Eject or Stop mode position. In the Eject mode, the internal holder of the housing is fully raised. This is fully lowered in the Stop mode.
- 6. When installing the front panel assembly, be sure to engage the housing door with the door lever of the cassette housing assembly. If this is omitted, the door will not open at Eject and the cassette cannot be removed.

1.2.2 Check without cassette housing

Mechanism operations can be observed easily by removing the cassette housing assembly. Note the following.

- 1. Disable the photo transistor sensor (END SENSOR) on the main-deck by applying an opaque cover.
- 2. Connect pins 2 and 3 of Main board connector CN601. (MECHACON SECTION)
- 3. Select the desired modes with the operation buttons. However, notice that without tape, setting for the reverse direction modes produces the Stop mode after a few seconds due to absence of the reel sensor output.

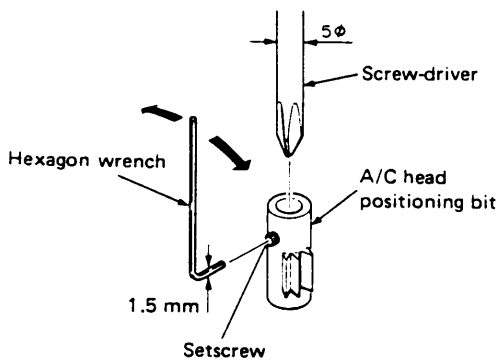


Fig. 1-2-1 A/C head positioning tool

1.2.3 Manually removing cassette tape

In event of electrical system failure that prevents the tape from being unloaded, the tape can be removed manually by the following procedure. Refer to Figs. 1-3-1, 1-3-2 and 1-3-3.

- 1. Disconnect power cord from AC outlet.
- 2. Turn the loading motor by hand so that the control cam rotates clockwise. This retracts the pole base assembly to the unloading position.
- 3. Continue turning to where the guide arm and half loading gear assemblies shift to beneath the cassette.
- 4. Turn the clutch assembly at the rear of the deck to absorb slack tape within the cassette.
- 5. Again turn the loading motor in the same direction to raise the cassette and remove it.

1.2.4 Test equipment

The following special tools and fixtures are required for mechanism adjustment.

- 1. Alignment tapes: MH-2  
Stairstep signal is employed for interchangeability checks and adjustments.
- 2. Torque gauge : PUJ48075-2  
Measures tape take-up torque.
- 3. Back tension cassette gauge : PUJ48076-2  
Measures tape tension at the supply side.
- 4. A/C head positioning bit : PTU94010
  - Shifts the head base for adjusting the control head position.
  - The installation of a A/C head positioning bit on the screw-driver.Refer to Fig. 1-2-1. Set screw-driver into the A/C head positioning bit where it does not interfere with adjusting the A/C head adjusting boss (position the screw-driver point  $6 \pm 2$  mm from point of the A/C head positioning bit). Slightly tighten the setscrew by hexagon-wrench (1.5 mm).
- 5. Roller driver : PTU94002  
Turns the guide roller for adjusting FM linearity.

Alignment tapes 1	Torque gauge 2	Back tension cassette gauge 3	A/C head positioning bit 4	Roller driver 5

Fig. 1-2-2 Test equipment

### 1.3 MAIN MECHANISM PARTS

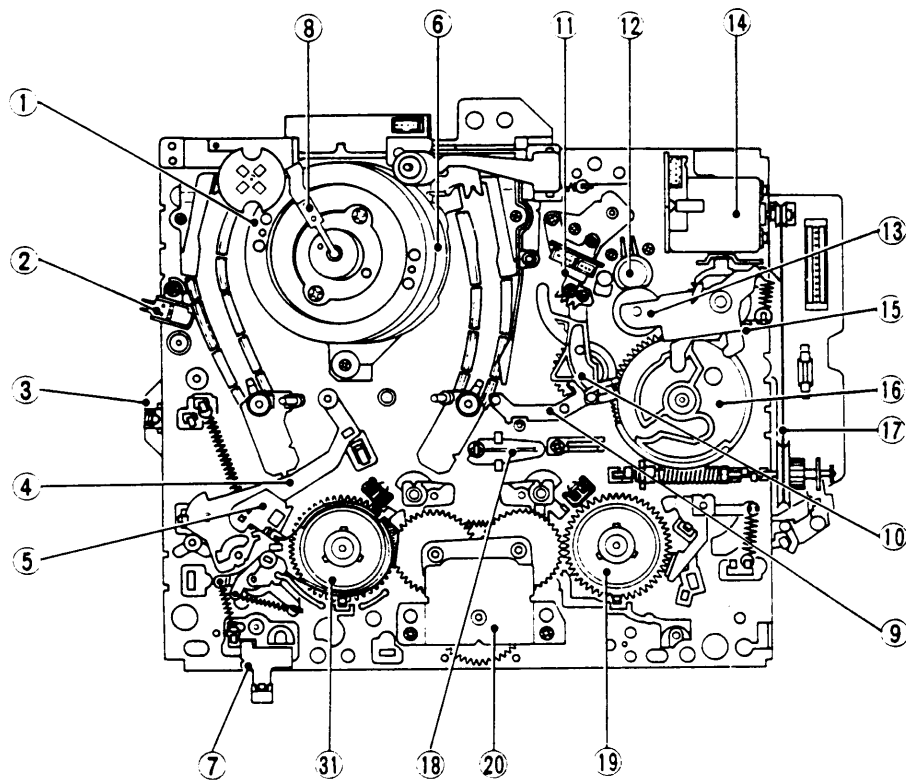


Fig. 1-3-1 Top view of main-deck

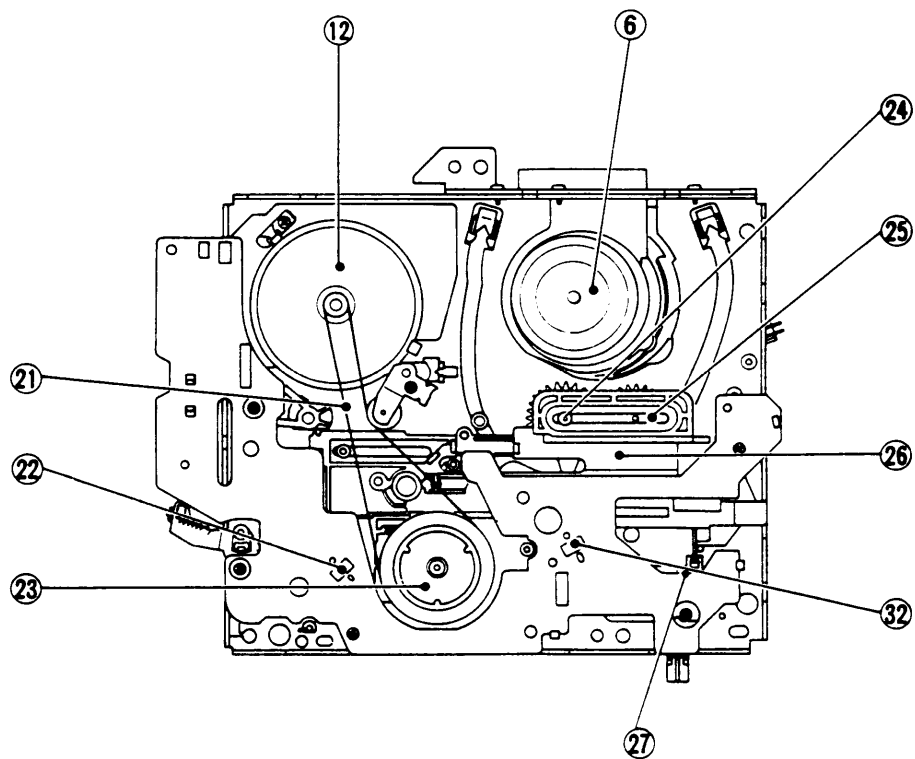


Fig. 1-3-2 Bottom view of main-deck



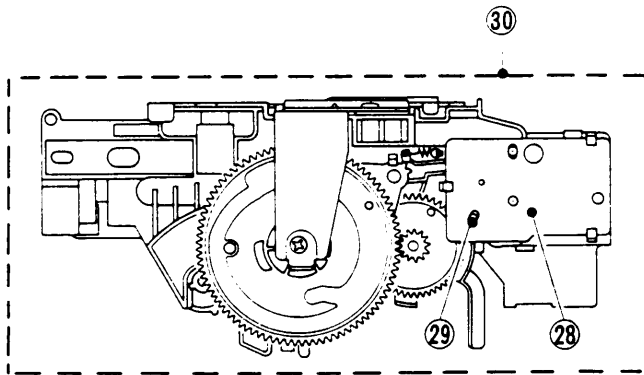


Fig. 1-3-3 Side view of cassette housing

#### A. Cleaning

Periodic cleaning of the tape transport system is desirable, but ordinarily not feasible in practice. Therefore, perform cleaning when a set is brought in for repairs or maintenance. Contamination of the video heads, tape guides and brushes can detract from playback picture quality and in extreme cases, even damage the tape. For cleaning, use a fine-mesh cotton cloth (about the texture of a white dress-shirt) moistened in alcohol.

- To clean the video heads, press the moistened cloth gently against the upper drum with fingertip and turn the drum by hand.
- Do not use a vertical stroke, as this may damage the heads.

#### B. Lubrication

Oil and grease do not normally require periodic replenishing. Apply only when replacing lubricated parts (also clean and replace lubrication of mating parts if soiled).

For parts and points to apply oil and grease, refer to the exploded views of the mechanism assembly.

Before oiling, clean with alcohol.

Apply one or two drops of oil. Avoid excess oil.

1. Table 1-1 indicates the oil and grease used in this set. Use these or recommended locally available equivalents.

Category	Part No.
Oil	COSMO-HV56
Grease	KANTO-G-31KAV

Table 1-1

2. Grease is not required for a replacement cassette housing assembly, as this has been applied at the factory.

**Note:** Stir grease that has been stored for an extended period.

#### C. Main mechanical parts

See Figs 1-3-1, 1-3-2 and 1-3-3.

No.	Symbol	Parts Name	See Section
1	M32A	Upper drum assy	1.5.1
2	M44	Full erase head	
3	51Q1	End sensor	
4	M41	Tension arm assy	1.5.4
5	M42	Tension band assy	1.5.4
6	M32C	Lower drum motor assy	1.5.2
7	M461	REC safety switch	
8	M32D	Brush assy	
9	M449	Half loading gear assy	1.5.5
10	M447	Guide arm assy	1.5.5
11	M48	A/C head	1.5.3
12	M422	Capstan motor	
13	M442	Pinch roller arm assy	
14	M434	Loading (Mode) motor assy	
15	M446	Pinch roller cam	1.5.5
16	M438	Control cam	1.5.5
17	M437	Loading belt	
18	M460	LED holder	
19	M430	Reel disk (take-up)	
20	M424	Idler gear unit	
21	M429	Timing belt	
22	51PS1	Take up reel sensor	
23	M426	Clutch unit	1.5.6
24	M433	Take up loading arm assy	1.5.7
25	M432	Supply loading arm assy	1.5.7
26	M439	Plate assy	1.5.7
27	M462	Slide encorder (S3)	
28	56PHS3	Cassette sensor	
29	56Q2	Start sensor	
30	M36	Cassette housing assy	
31	M470	Reel disk (supply)	
32	51PS2	Supply reel sensor	

- Symbol interpretation example



## 1.4 INSPECTION AND MAINTENANCE

This product employs rotary and moving parts which wear out in the course of usage. Periodic inspection, cleaning, lubrication and maintenance are therefore important for ensuring maximum performance. Worn parts must also be replaced at when required.

### 1.4.1 Suggested servicing schedule for main components

The following table indicates the suggested period for such service measures as cleaning, lubrication and replacement. In practice, the indicated periods will vary widely according to environmental and usage conditions. However, the indicated components should be inspected when a set is brought for service and the maintenance work performed if necessary.

Also note that rubber parts may deform in time, even if the set is not used.

System	No.	Parts Name	Symbol No.	Periodic servicing schedule (operation hours)							
				250	500	750	1000	1250	1500	1750	2000
Tape Transport	1	Upper drum	M32A	★	★	☆	○	○	○	○	○
	11	A/C head	M48	★	★	★	○	○	○	○	○
	13	Pinch roller	M442	★	★	★	○	○	○	○	○
	2	Full erase head	M44	★	★	★	○	○	○	○	○
	4	Tension arm	M41				○	○	○	○	○
	6	Lower drum	M32C				○	○	○	○	○
	12	Capstan (shaft)	M422	★	★	★	★	★	★	★	★
	9	Half loading gear	M449								
	10	Guide arm	M447								
Drive	12	Capstan motor	M422				○	○	○	○	○
	17	Loading Belt	M437				○	○	○	○	○
	21	Reel Belt	M424				○	○	○	○	○
	19	Take-up reel disk	M430				○	○	○	○	○
	31	Supply reel disk	M470				○	○	○	○	○
	23	Clutch assy	M426								
	14	Loading motor	M434				○	○	○	○	○
		Worm clutch assy	M436								△
Others	26	Plate assy	M439								△
	5	Tension band	M42				○				○
	8	Brush	M32D				○				○

★ : Cleaning

☆ : Cleaning (or Replacement if necessary)

△ : Lubrication

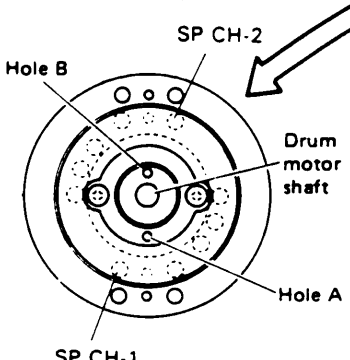
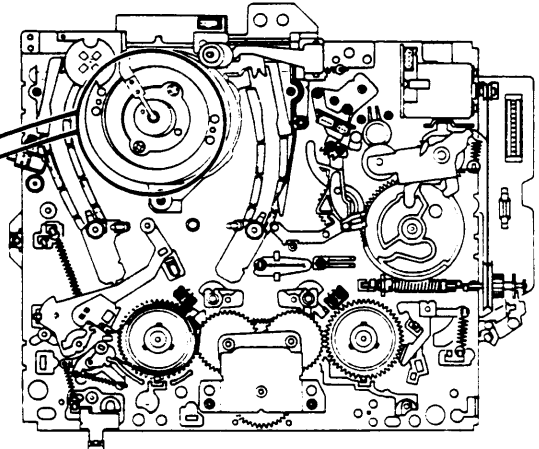
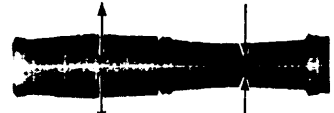
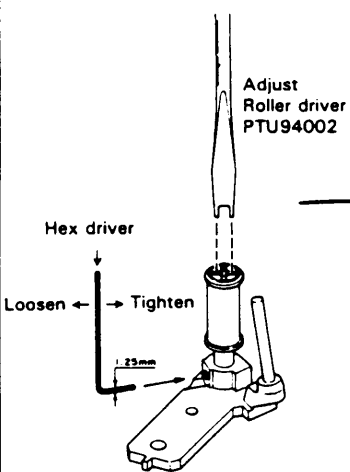
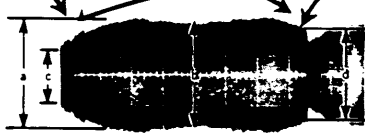
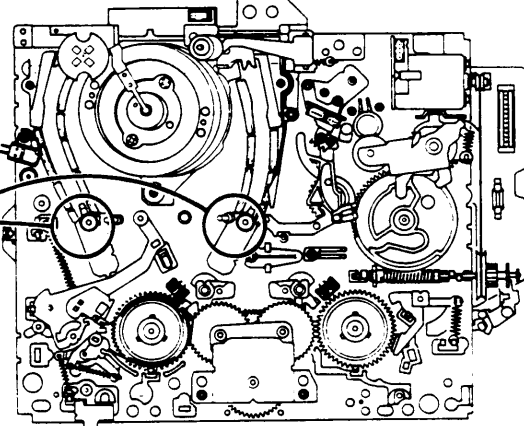
No: Refer to Main mechanical parts

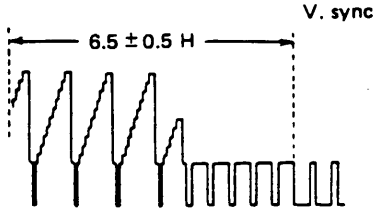
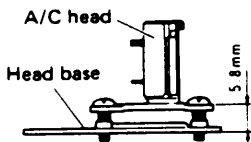
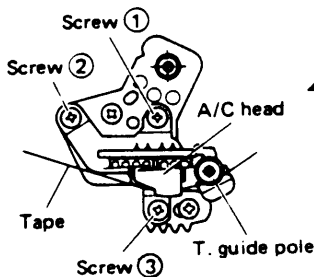
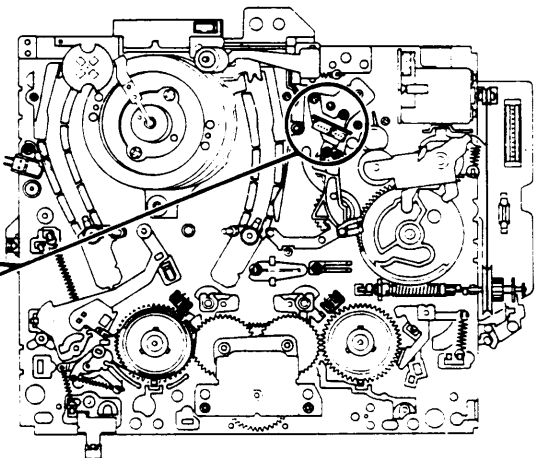
▲ : Lubrication (or Replacement if necessary)

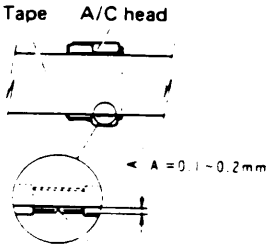
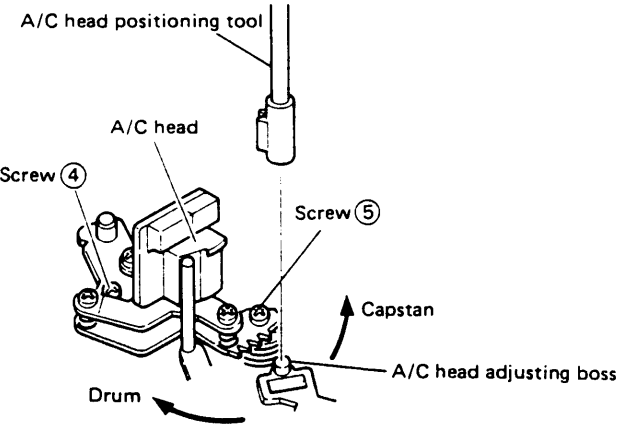
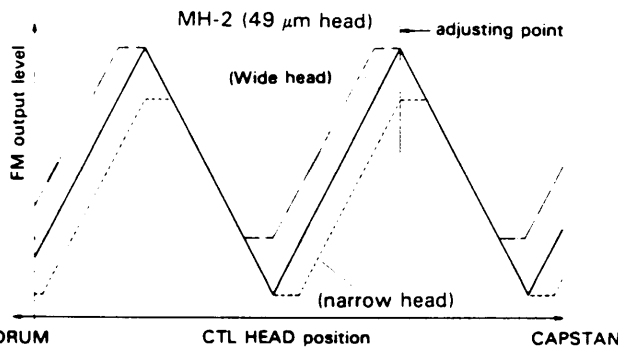
○ : Inspection or Replacement if necessary

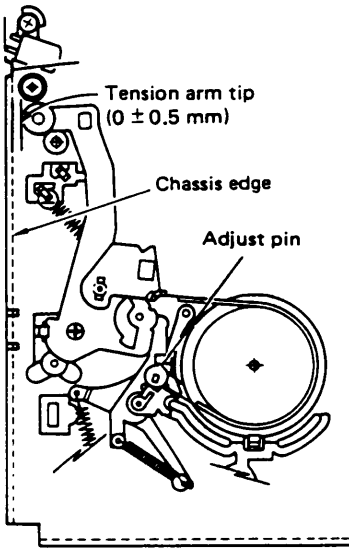
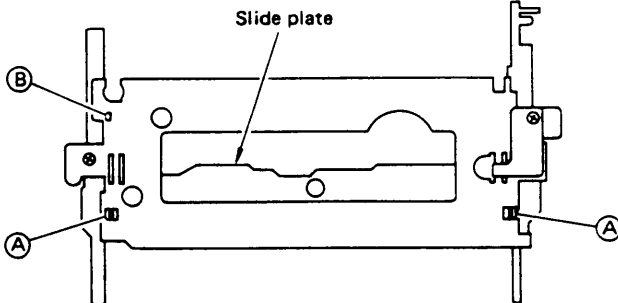
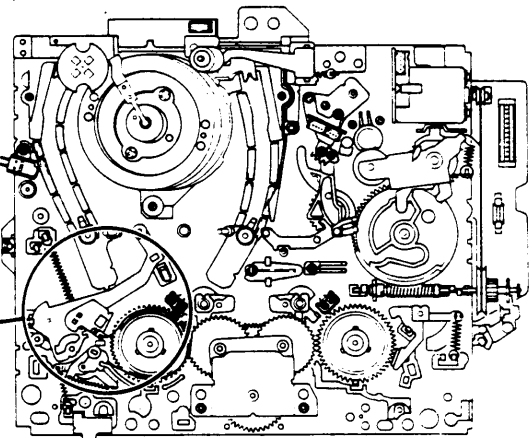
Table 1-4-1 Approximate maintenance schedule

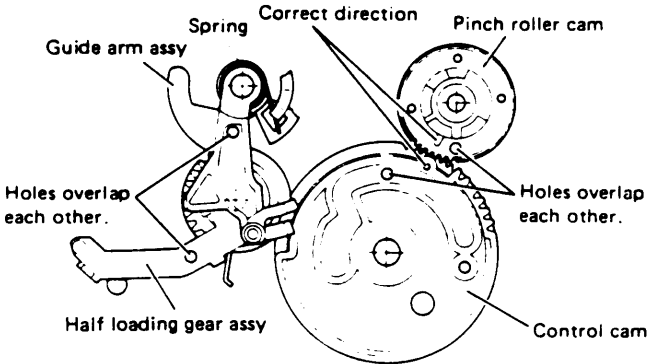
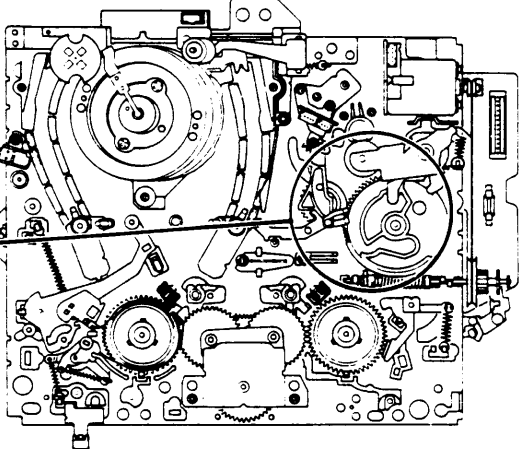
1.5 MAIN PARTS REMOVAL AND REPLACEMENT

No.	Item	Checkpoints	Adjustment and Checks
1	<div>Upper drum assembly</div> <div>•Symptoms: FM signal absent, intermittent or weak on one channel; large difference in channel output levels</div> <div>•Cause: Worn or damaged video heads, poor response, etc.</div> <div><div>Fig. 1-5-1 Drum top view</div></div>	<div><div>Fig. 1-5-2 Drum Position</div></div>	
		<div>Mounting direction See Fig. 1-5-1. (Symptom: no picture)</div>	<div>After replacing, observe that upper drum hole A is opposite the motor axis from lower drum hole B.</div>
		<div>Axis wobble See Fig. 1-5-2. (Symptom: jitter, poor FM linearity) PB FM: Main board TP206 DRUM FF: Main board TP411</div>	<div>Record and playback. Confirm absence of large difference between channels. (Fig. 1-5-3)</div> <div><div>Fig. 1-5-3 Axis wobble</div></div>
	<div><div>Fig. 1-5-4 S.T. Pole base</div></div>	<div>FM linearity check See Fig. 1-5-5. (Symptom: vertical sync absent, picture noise) PB FM: Main board TP206 DRUM FF: Main board TP411</div> <div><div>Fig. 1-5-5 FM linearity</div><div><math>\frac{b}{a} \geq 0.7, \frac{c}{a} \geq 0.65, \frac{d}{a} \geq 0.65</math></div></div>	<div><div>Fig. 1-5-6 S.T. Pole base position</div></div> <div><div>1) Play staircase signal of the MH-2 Alignment Tape. Confirm absence of obvious FM waveform loss and that operating the Tracking yields the optimum point.</div><div>2) Refer to Fig. 1-5-4, adjust for loss at the left edge (drum entry) of the FM waveform by turning the guide roller of the supply pole base. Similarly, adjust for loss at the right edge (drum exit) by turning the guide roller of the take-up pole base.</div></div> <div><div>Note: If FM loss occurs on both channels and cannot be corrected by adjusting the guide rollers, the lower drum needs replacement.</div></div>

No.	Item	Checkpoints	Adjustment and Checks
	<b>PB switching point</b> •Symptom: switching noise at picture bottom.	TP210 (VIDEO OUT)  <b>Fig. 1-5-7</b> PB Switching Point	1) Connect an oscilloscope to TP210. 2) Set the MH-2 alignment tape into the cassette housing. Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (– slope) with the signal from TP411 (DRUM FF) of the main board. 4) Adjust R402 to position the trigger point $6.5 H \pm 0.5 H$ from V. sync as shown in Fig. 1-5-7.
2	<b>Lower drum assembly</b> •Symptoms: Poor FM linearity, noisy rotation, jitter •Cause: Lead and bearing wear	Check FM linearity and switching point. Check control head phase (X value) Symptom: tracking error PB FM: Main board TP206 DRUM FF: Main board TP411	See above upper drum assembly items. 1) Play stairstep signals of MH-2 Alignment Tape. Engage the Tracking Preset mode by pressing the “V” and “A” TV PROG buttons simultaneously in the onscreen mode. Confirm that the same maximum FM waveform level is obtained as when the tracking is adjusted manually. 2) Refer to the A/C head adjustments.
3	<b>A/C head</b>  <b>Fig. 1-5-8</b> Temporary height  <b>Fig. 1-5-9</b> Inclination/Azimuth/Height adj.	Temporarily set height as indicated in Fig. 1-5-8. Tilt (forward inclination) See Fig. 1-5-9. (Symptom: audio level varies greatly.) Azimuth See Fig. 1-5-9. (Symptoms: audio low level or noisy) Audio output: Main board AUDIO OUT	 <b>Fig. 1-5-10</b> A/C HEAD position Set the height as indicated in Fig. 1-5-8 to facilitate tape transport checks and adjustments. 1) Run tape, turn screw ① counterclockwise to where slight curling of the tape occurs at the lower flange of the take-up guide roller. 2) Then slowly turn the screw clockwise to where the curling ceases. 1) Play stairstep signal (with audio 6 kHz) of the MH-2 Alignment Tape. Observe audio output signal with oscilloscope. 2) Turn screw ② and adjust for maximum audio output level.

No.	Item	Checkpoints	Adjustment and Checks
	 <p>Fig. 1-5-11 Height Adj</p>	<p><b>Height</b> See Figs 1-5-9 and 1-5-11. (Symptom: low audio and control signal levels)</p> <p><b>FM linearity</b></p>	<p>1) Run tape and observe the control head area. 2) Turn screws ①, ② and ③ by small and equal amounts until 0.1 to 0.2 mm of the head core bottom can be seen.</p> <p><b>Note:</b> <i>If difficult to observe, play stairstep signal of MH-2 Alignment Tape and adjust for maximum audio output and control pulse level.</i></p> <p>Refer to upper drum assembly items. If adjustment is major, again check the azimuth.</p>
	 <p>Fig. 1-5-12 CTL head phase</p>	<p><b>Control head phase</b> See Fig. 1-5-12 PB FM: Main board TP206 FF: Main board TP411</p>	<p>1) Play stairstep signal of MH-2 Alignment Tape and observe the FM waveform. Set for Tracking preset by pressing the "V" and "Λ" TV PROG buttons simultaneously in the playback mode. 2) Loosen screws ④ and ⑤. Set the A/C head positioning tool on the A/C head adjusting boss as shown in Fig. 1-5-12. 3) Turn the tool first to position the A/C head fully toward the capstan. Then gradually return it toward the drum and stop at the position of maximum FM waveform output level as shown in Fig. 1-5-13. 4) Tighten screw ⑤. Remove the tool and tighten screw ④.</p>
			 <p>Fig. 1-5-13 CTL head phase</p> <p><b>Note:</b> <i>Trigger the oscilloscope externally signal from TP411 (DRUM FF). Use (+) trigger for MH-2 alignment tape.</i></p>

No.	Item	Checkpoints	Adjustment and Checks
4	<p>Tension arm assembly Tension band assembly</p>  <p>Tension arm tip (<math>0 \pm 0.5</math> mm)</p> <p>Chassis edge</p> <p>Adjust pin</p> <p><b>Fig. 1-5-14</b> Tension arm assy</p>  <p>Slide plate</p> <p><b>Fig. 1-5-16</b> Cassette housing</p>	<p>Tension pole position See Fig. 1-5-14. (Symptom: poor FM waveform response)</p>	 <p><b>Fig. 1-5-15</b> Tension arm position</p> <ol style="list-style-type: none"> <li>1) Remove video cassette tape and set for the playback mode as following steps.</li> <li>2) Disconnect VCR from AC. Slightly rotates the loading motor counterclockwise by hand, then press the lock level portion (A) of the cassette housing by hand as shown in Fig. 1-5-16.</li> <li>3) Move the raised portion of the cassette housing slide plate to fully forward by hand with loading motor. At this time, again press the lock level portion (B) of the cassette housing slide plate to lower the cassette housing (internal holder of the cassette housing is locked in lowered position).</li> <li>4) Cover the cassette LED with opaque material (insulated tape with black).</li> <li>5) Connect VCR to AC. Press the power button on the Front panel and set for the playback mode.</li> <li>6) Turn the eccentric adjust pin to align the edge of the chassis with the tension arm tip as shown in Fig. 1-5-14.</li> </ol>
		<p>Back tension (Symptom: skew)</p>	<ol style="list-style-type: none"> <li>1) When the tension pole position is correctly adjusted, the back tension will assume the correct value.</li> <li>2) Use the Back Tension Cassette Gauge and set for the playback mode. Confirm reading of 30 to 43.</li> <li>3) Changing the tension pole position in order to vary the back tension will cause adverse effects elsewhere.</li> </ol>

No.	Item	Checkpoints	Adjustment and Checks
5	Pinch roller cam Control cam Half loading gear assembly Guide arm assembly   <p data-bbox="264 846 691 875">Fig. 1-5-17 Control/Pinch roller cam</p>	<p data-bbox="539 913 855 1039">Important: Do not remove or disturb parts other than those mentioned. See Fig. 1-5-17.</p>	<p data-bbox="925 297 1449 387">Set mechanism to Eject mode (internal holder of the cassette housing is locked in raised) position.</p>  <p data-bbox="986 880 1377 909">Fig. 1-5-18 Control cam position</p> <ol data-bbox="925 913 1449 1451" style="list-style-type: none"> <li>1) When installing the pinch roller cam, overlap the largest hole of the gear portion with the hole of the deck.</li> <li>2) Set the control cam on the deck with the hole of the groove overlapped with the hole of the deck. Observe that the small hole of the control cam and the ridge of the pinch roller cam are aligned. (If the control cam does not fit readily, shift the rear plate assembly within the range of play.)</li> <li>3) Install the half loading gear assembly with the hole overlapped with the hole of the deck. Secure with E-ring.</li> <li>4) Install the guide assembly over the spring and with the hole overlapping that of the deck. Engage the spring correctly.</li> </ol>
		Cassette housing assembly	<p data-bbox="925 1518 1449 1637">Install the cassette housing assembly with the mechanism in the Eject mode. Also observe that the inner holder of the housing is raised and locked.</p>
6	Clutch assembly	Take-up torque (Symptom: inadequate take-up torque)	<ol data-bbox="925 1724 1449 1944" style="list-style-type: none"> <li>1) Remove cassette housing and set for play-back mode (see Section 1.2).</li> <li>2) Set torque gauge on the take-up reel disk. Gradually relax your grip on the gauge and read the needle indication at the point the gauge begins to rotate with the disk. Confirm indication of 60 to 100.</li> </ol>

No.	Item	Checkpoints	Adjustment and Checks
7	Take-up loading arm assembly Supply loading arm assembly Plate assembly		<p><b>Note:</b></p> <ul style="list-style-type: none"> <li>• Set mechanism to the Eject or Stop mode before removing these parts.</li> <li>• The flange of the plastic rivet securing the loading arm assembly and the pole base assembly can be damaged by attempting to remove it directly. Press the loading arm assembly firmly to prevent motion. Then use a narrow-shafted tool to press the rivet from the shaft end to remove it.</li> </ul>
		<p><b>Mounting position alignment</b></p> <ul style="list-style-type: none"> <li>• Remove the tension arm assembly to facilitate operation.</li> </ul> <p>See Fig. 1-5-19.</p>	<p>1) Set the supply and take-up loading arm assemblies so that the holes of the gear portions are aligned, then secure to the pole base assemblies with rivets.</p> <p>2) Shift the plate assembly and install with the holes of the upper and lower components overlapped.</p>
		<p><b>Slide switch</b></p> <p>See Fig. 1-5-19.</p>	<p>Be sure to engage the slide switch slider with the edge of the plate assembly.</p> <div data-bbox="183 1008 909 1411"> </div> <p><b>Fig. 1-5-19</b></p> <div data-bbox="941 996 1476 1444"> </div> <p><b>Fig. 1-5-20</b> T.S. Loading arm position</p>



## SECTION 2 ELECTRICAL ADJUSTMENTS

### 2.1 PREPARATION

Electrical adjustments are required after replacing circuit components and certain mechanical parts.

It is important to perform these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.

#### 2.1.1 Required test equipment

1. Color television or monitor
2. Oscilloscope:  
wide-band, dual-trace, triggered delayed sweep
3. Frequency counter
4. Audio oscillator
5. Audio voltmeter
6. Digital voltmeter
7. Signal generator: RF/IF sweep/marker
8. Signal generator: PAL color bar, stairstep, video sweeper
9. Signal generator: Audio multiplex TV signal generator
10. Recording tape
11. Alignment tape: MH-2
12. Presetting unit: PTU94008.

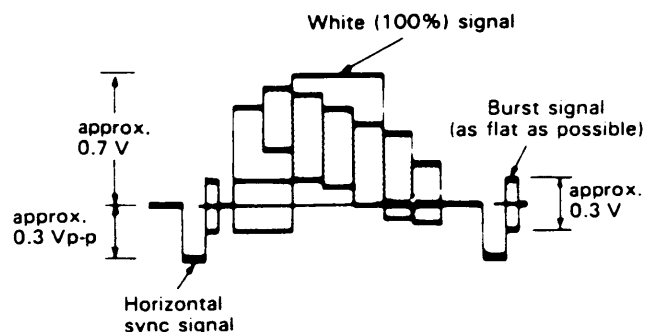
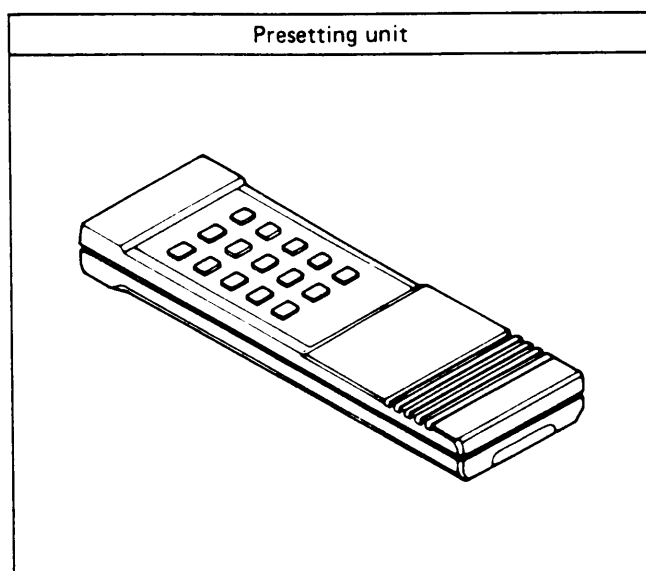


Fig. 2-1-1 Colour bar signal of pattern generator

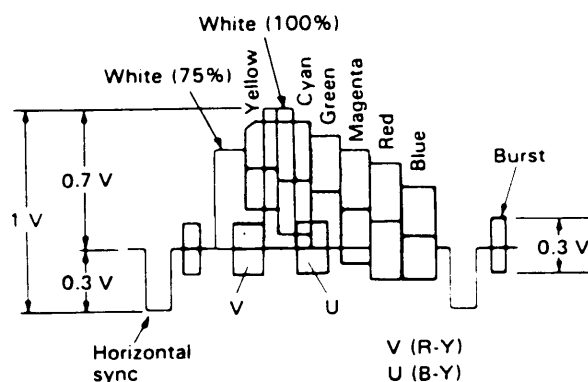


Fig. 2-1-2 Colour bar signal waveform

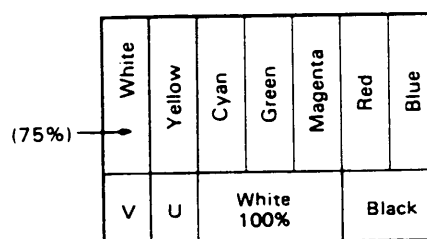


Fig. 2-1-3 Colour bar pattern

2.1.2 Check and adjustment steps

The check and adjustment steps are provided in the following in the form of charts. For clarity, the nomenclature used in the charts is outlined below.

No.	Checks and adjustments are numbered in the recommended sequence in which they are to be performed.
Item	Name assigned to the particular check and adjustment step.
Check Point	Location to which measuring instrument (oscilloscope unless otherwise noted) is to be connected.
Adjustment Parts	Variable component (resistor, capacitor, etc.) to be adjusted in this step. Dash (—) indicates check only.
Signal & Mode	<ul style="list-style-type: none"><li>• Input signal required to perform adjustment. Dash (—) indicates that special signal is not required.</li><li>• Equipment operating mode at time of check or adjustment.</li></ul>
Color bars	Color bars signal as video input.
Stairstep	Stairstep signal as video input.
1 kHz	1 kHz sinewave as audio input signal.
MH-2 color bars	Color bars segment of MH-2 alignment tape.
MH-2 stairstep	Stairstep segment of MH-2 alignment tape.
MH-2 1 kHz	1 kHz audio signal segment of MH-2 alignment tape.
MH-2 RF sweep	RF sweep segment of MH-2 alignment tape.
E-E	Power on and machine in Stop mode.
REC	Recording mode
PB	Playback mode
SEARCH	Search (FWDS and REVS) playback mode
SLOW	Slow motion playback mode
STILL	Pause during playback mode
SP mode	SP recording speed
Description	This column provides an explanation of the step, notes and adjustment values.

## 2.2 SWITCHING REGULATOR CIRCUIT

**Note:** Unless otherwise specified, all test points and adjustments are located on the MAIN board.

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	5V DC output voltage	• REC	• TUNER	• TP805 • TP803 (GND)	• R809	1) Connect a digital voltmeter between TP805 and TP803. 2) Record in the TUNER mode, adjust R809 for $5.30 \pm 0.05$ V.

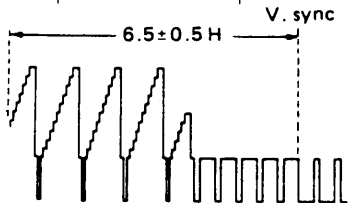
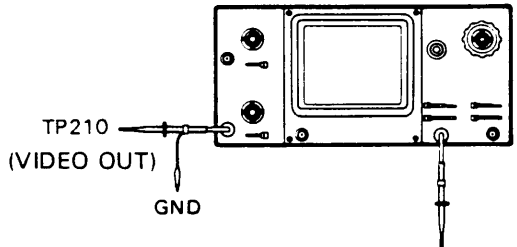
## 2.3 TIMER CIRCUIT

**Note:** Unless otherwise specified, all test points and adjustments are located on the T/D/S board.

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	Clock	• EE	• AUX	• IC1-16	• C6	<b>Note: For below adjustments use 10:1 probe with input capacitance less than 100 pF.</b> 1) Disconnect VCR from AC, and then connect a frequency counter between IC1-16 and GND. 2) Short IC1-8 to GND, then short the leads of capacitor C3 once in order to reset IC1. 3) Connect VCR to AC. All FDP Segments are on. 4) Adjust C6 for $2048.000 \pm 0.002$ Hz (488.2808 to 488.2818 $\mu$ sec).


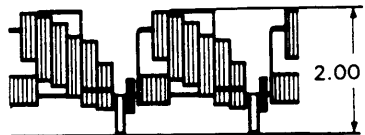
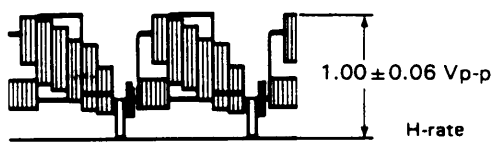
## 2.4 SERVO CIRCUIT

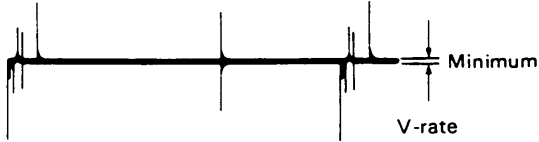
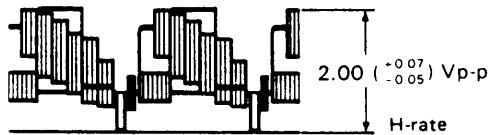

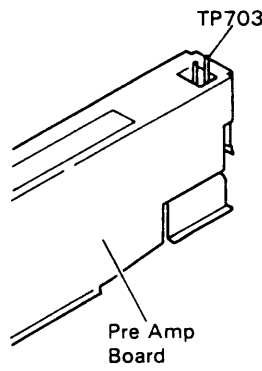
**Note:** Unless otherwise specified, all test points and adjustments are located on the MAIN board.


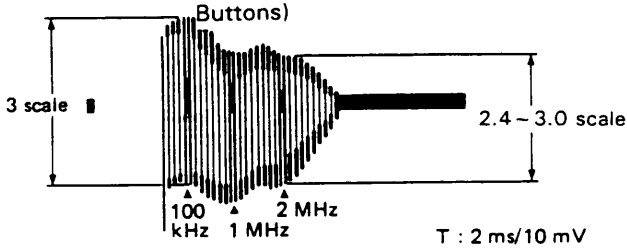
No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	PB switching point	• PB	• MH-2 stairstep • Trigger slope (–) 	• TP210 (VIDEO OUT)	• R402	1) Connect an oscilloscope to TP210. 2) Play back the stairstep segment of MH-2 alignment tape. 3) Trigger the oscilloscope externally (– slope) with the signal from TP411. 4) Adjust R402 to position the trigger point $6.5 \pm 0.5$ H from V. sync. 
2	Slow tracking preset	• REC then PB (slow)		• TV monitor	• Presetting unit (PTU-94008)	<b>Note: Set VCR to A mode by remote controller.</b> 1) Set recording video tape into the cassette housing. 2) Receive a colour broadcast on a VHF-HI channel or supply a colour bar signal to VIDEO IN. 3) Record a colour broadcast or colour bar signal. 4) Play back recorded signal in the FWD slow mode and set the tracking control of the FRONT panel to the center position by simultaneously pressing the (V) and (Λ) TV PROG buttons. 5) Observe the display on a monitor-TV and adjust for optimum noise condition (best tracking) by depressing "B (–)" or "C (+)" buttons of presetting unit as required. 6) Depress the STOP button on the FRONT panel. 7) Confirm that the bar noise is not visible on the monitor in the slow mode.

## 2.5 VIDEO CIRCUIT

**Note:** Unless otherwise specified, all test points and adjustments are located on the VIDEO unit board.

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
<div>IMPORTANT: Item 1,2,3 and 4</div> <div>1. Ordinarily avoid performing these adjustments. It should be performed only if IC1 of the VIDEO UNIT board has been replaced.</div> <div>2. To adjust, replace fixed resistor with variable resistor, then adjust as required.</div>						
1	EE level & White clip	• EE	• Colour bar	•CN207-15 (Main board) •IC1-22	•R60 (EE level) •R64 (white clip) (VIDEO UNIT)	<div>1) When IC1 of the VIDEO UNIT board is replaced, it may also be necessary to replace R60 and R64 with adjustable resistors.</div> <div>2) Confirm <math>2.00 \begin{smallmatrix} +0.07 \\ -0.05 \end{smallmatrix}</math> Vp-p EE level at CN207-15 and white clip of <math>90 \pm 4\%</math> at IC1-22. If necessary, replace R60 with NVP1301-103NU and R64 with NVP1301-332NU.</div> <div>3) Supply a colour bar signal to VIDEO IN, connect one channel of a dual trace oscilloscope to CN207-15 and the other channel to IC1-22.</div> <div>4) Alternately adjust R60 and R64 for <math>2.00 \begin{smallmatrix} +0.07 \\ -0.05 \end{smallmatrix}</math> Vp-p at CN207-15 and white clip of <math>90 \pm 4\%</math> at IC1-22.</div> <div><p style="text-align: center;"><math>a : b = 100 : 90</math></p><p style="text-align: center;">Fig. 2-5-1 White clip</p></div>
2	Carrier & Deviation	• EE	•AUX	•CN206-9 (Main board)	•R41 (carrier) (VIDEO UNIT)	<div>1) When IC1 of the video unit board is replaced, it may also be necessary to replaced R41 and R42 with adjustable resistors.</div> <div>2) Play back a colour bar segment of MH-2 and confirm <math>1.00 (\pm 0.06)</math> Vp-p Y level at VIDEO OUT (75Ω load). If necessary, replace R41 with NVP 1301-223NU and R42 with NVP1301-103NU.</div> <div>3) Without an incoming signal. Terminate VIDEO OUT with TV-monitor (75Ω load), connect a frequency counter to CN206-9 on the MAIN board.</div> <div>4) Adjust R41 for <math>3.8 \pm 0.04</math> MHz.</div> <div>5) Play back a colour bar segment of MH-2, and confirm <math>1.00 (\pm 0.06)</math> Vp-p at VIDEO OUT. If necessary, redplace R17 with NVP1301-222NU.</div> <div><p style="text-align: center;">Fig. 2-5-2 VIDEO OUT</p></div>
			<div>IMPORTANT: Ordinarily avoid performing this adjustment. It should be performed only if IC1 of the VIDEO UNIT board has been replaced or if significant waveform distortion and S/N deterioration occur during recording and playback due to deficient adjustment of the carrier set and deviation.</div>			
		• REC then PB	• Colour bar •AUX	•TP210 Video out (Main board)	•R42 (deviation) (VIDEO UNIT)	<div>6) Record and play back a colour bar signal. If necessary, before recording, adjust R42 so that the Y level becomes <math>1.00 (\pm 0.06)</math> Vp-p at VIDEO OUT during playback mode.</div> <div><p style="text-align: center;">Fig. 2-5-3 Carrier and deviation</p></div>

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
3	YNR NC balance	• EE	• Colour bar • AUX	• IC1-9 (VIDEO UNIT)	• R56 (NC BAL) (VIDEO UNIT)	<ol style="list-style-type: none"> <li>1) When IC1 of the video unit board is replaced, it may also be necessary to replace R56 with adjustable resistor.</li> <li>2) Supply a colour bar signal to VIDEO IN, connect an oscilloscope to IC1-9 on the VIDEO UNIT board.</li> <li>3) Confirm minimum DC step difference. If necessary, replace R56 with NVP1301-152NZ.</li> <li>4) Adjust R56 for minimum DC step difference.</li> </ol>
 <p>Fig. 2-5-4 YNR NC balance</p>						
4	PB Y level	• REC then PB	• Colour bar • AUX • TP411 (DRUM FF) (Main board)	• CN207-15 (Main board)	• R17 (PB Y level) (VIDEO UNIT)	<ol style="list-style-type: none"> <li>1) When IC1 of the video unit board is replaced, it may also be necessary to replace R17 with adjustable resistor.</li> <li>2) Record and play back a colour bar signal, confirm <math>2.00 \begin{smallmatrix} +0.07 \\ -0.05 \end{smallmatrix}</math> Vp-p Y level at CN207-15. If necessary, replace R17 with NVP1301-222NU.</li> <li>3) Connect oscilloscope to CN207-15.</li> <li>4) Record and play back a colour bar signal, adjust R17 for <math>2.00 \begin{smallmatrix} +0.07 \\ -0.05 \end{smallmatrix}</math> Vp-p at CN207-15.</li> </ol>
 <p>Fig. 2-5-5 PB Y level</p>						
5	REC FM level	• REC	• Colour bar	• TP703 (Pre/Rec board)	• R246 (REC FM ADJ) (Main board)	<ol style="list-style-type: none"> <li>1) Supply a colour bar signal to VIDEO IN, connect an oscilloscope to TP703 of the PRE/REC board.</li> <li>2) Record the colour bar signal.</li> <li>3) Adjust R246 for 0.42 Vp-p pedestal level between centers of the waveform outline at the pedestal portion.</li> </ol>
 <p>Fig. 2-5-6 REC FM level</p> 						

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
6	REC colour level and Ch balance	• PB	• MH-2 colour bar • AUTO tracking off	• IC1-41 (VIDEO UNIT)	• R215 (MAIN board)	1) Connect an oscilloscope to IC1-41 and observe colour signal level. 2) Set the MH-2 alignment tape into the cassette housing, play back the colour bar segment of MH-2 alignment tape. 3) Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "V" and "Λ" TV PROG buttons. 4) Adjust by pressing the "V" and "Λ" TV PROG buttons of the Front panel for maximum level of the colour waveform and make a note of the higher colour level "A". 5) Press the STOP button on the FRONT panel and eject the MH-2 alignment tape.
		• REC then PB				6) Set recording video cassette into the cassette housing. Supply a colour bar signal to VIDEO IN. 7) Trigger the oscilloscope externally with the signal from TP411 (DRUM FF) of the Main board. Use (-) trigger for CH1 and (+) trigger for CH2. 8) Record a colour bar signal. 9) Play back recorded colour bar signal. Set the tracking of the FRONT panel to the Auto tracking off position by simultaneously pressing the "V" and "Λ" TV PROG buttons and confirm $85 \pm 5\%$ of the noted colour level at IC1-41. If necessary, before recording, adjust R215 so that the higher level channel becomes $85 \pm 5\%$ of the noted level "A" during playback as shown in Fig. 2-5-7. At this time, confirm that the channel level difference is within 3 dB. <b>Note: Repeat the above step 9) several times.</b>
						
Fig. 2-5-7 REC colour level						
7	PB Frequency	• REC then PB	• Video sweep • Auto tracking off ("V" and "Λ" TV PROG Buttons)	• TP210 (MAIN board)	• R208 (MAIN board)	1) Terminate VIDEO OUT with monitor - TV (75 Ω load), supply a video sweep signal without burst to VIDEO IN. 2) Set recording video cassette into the cassette housing. Record a video sweep signal without burst. 3) Connect an oscilloscope to TP210. Play back recorded video sweep signal, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the (V) and (Λ) TV PROG buttons. 4) Use the control of the oscilloscope to position the 100 kHz region at graduation 3 (0 dB) of the oscilloscope scale. 5) Adjust R208 to position the 2 MHz of channel-1 portion at 2.4 ~ 3.0 (-1 ± 1 dB) of the oscilloscope graduations as shown in Fig. 2-5-8. At this time, confirm that the channel difference is within 2 dB.
						
Fig. 2-5-8 PB frequency						

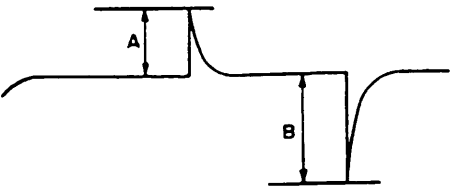
No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
			<ul style="list-style-type: none"> <li>•TV broadcast</li> <li>•Auto tracking off ("V" and "Λ" TV PROG Buttons)</li> </ul>	•TV monitor		<b>Alternate method</b> 1) Set recording video cassette into the cassette housing, receive a colour broadcast on a VHF channel. 2) Record a colour broadcast that shows a good depiction of human facial contours. 3) Play back recorded colour broadcast, set the tracking of the Front panel to the Auto tracking off position by simultaneously pressing the "V" and "Λ" TV PROG buttons. 4) Adjust R208 to obtain distinct facial features on the monitor. <b>Note: R208 nearly at centre position.</b>
8	SECAM DET	•EE	•SECAM colour bar	•TP280 (Main board)	•L282 (Main board)	1) Connect an oscilloscope to TP280. 2) Adjust L282 so that A and B are related as follows: $A : B = 3 : 4$ 

Fig. 2-5-9 SECAM detector

## 2.6 AUDIO CIRCUIT

**Note:** Unless otherwise specified, all test points and adjustments are located on the MAIN board.

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
1	Audio bias level	•REC	<ul style="list-style-type: none"> <li>•No input signal</li> <li>•AUX</li> </ul>	<ul style="list-style-type: none"> <li>•TP331 (+)</li> <li>•TP332 (-)</li> </ul>	•B301, B302 (Bias adj)	1) Set recording video cassette into the cassette housing. 2) Set for the REC mode without all incoming signal. 3) Connect a millivoltmeter between TP331 (INPUT) and TP332 (GND), and confirm $2.6 \pm 0.5$ mVrms of the bias level at TP331. If necessary, preform the step 4). 4) If level is higher than $2.6 \pm 0.5$ mV, remove B301. If level is lower than $2.6 \pm 0.5$ mV, remove B302.

Purpose:

Represent the best compromise of low distortion, extended high-frequency, and high output.

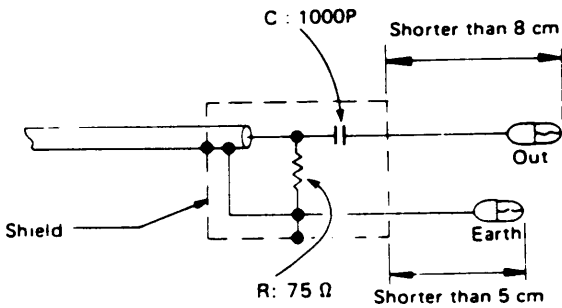
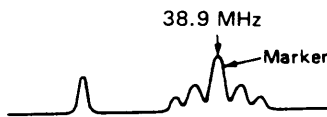
Maladjustment:

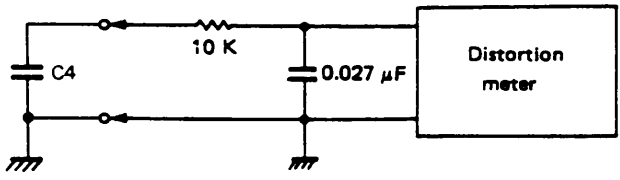
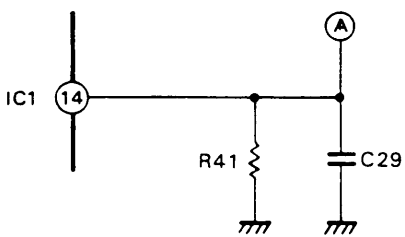
Result in poor signal-to-noise ratio and severe distortion.



## 2.7 TUNER/IF CIRCUIT

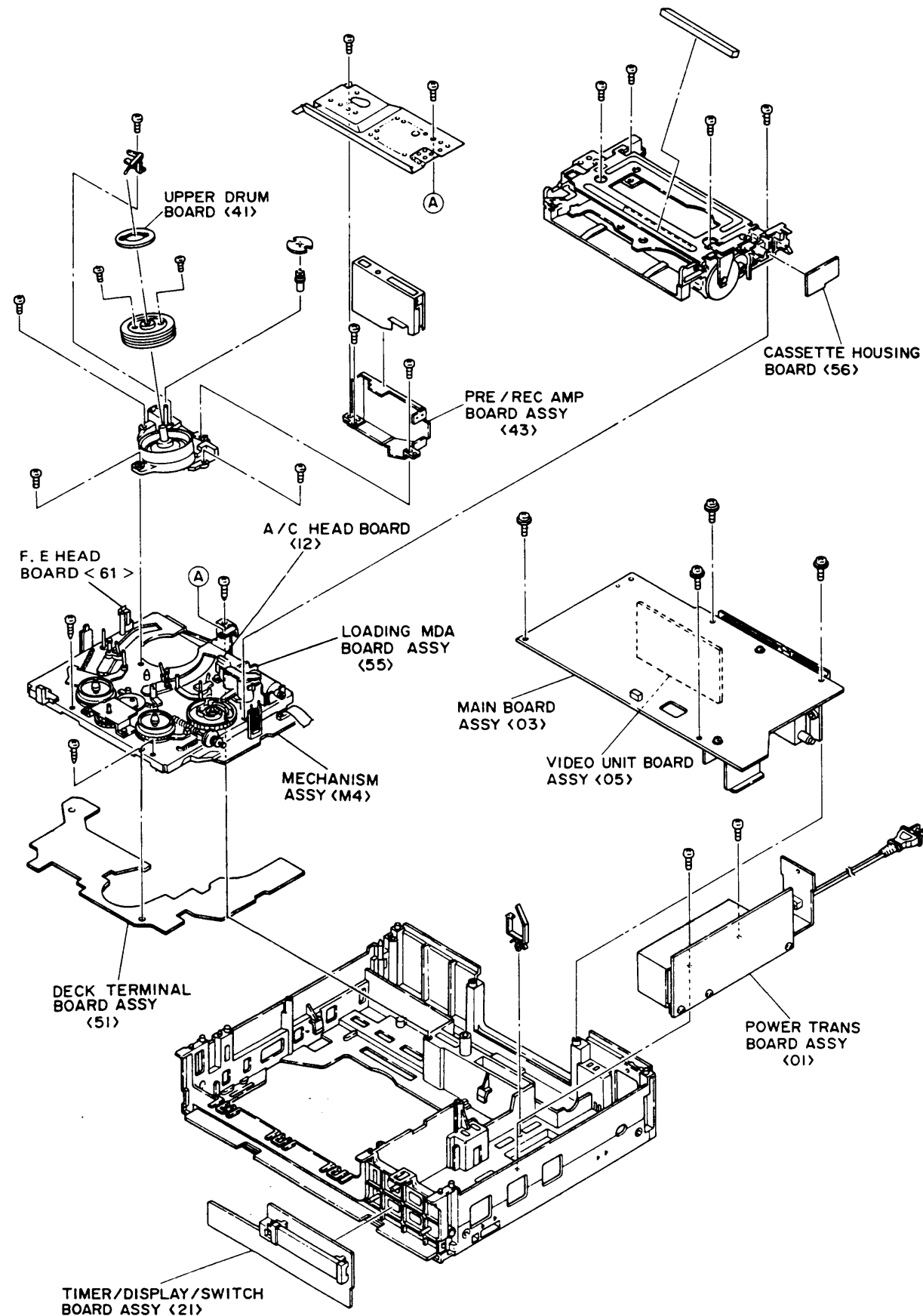
**Note:** Unless otherwise specified, all test points and adjustments are located on the TUNER/IF board.

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
<div>Equipment required:</div> <div><div>1. Oscilloscope</div><div>2. IF sweep signal generator with suitable markers (PIF, etc.)</div><div>3. Sweeper probe (sweep signal supply cable) as shown below.</div></div> <div></div> <div>Fig. 2-7-1 Sweeper probe</div>						
1	VCO	• EE	• Tuner	• IC1-17	• T4	<div><div>38.9 MHz</div><div>Marker</div><div></div><div>Fig. 2-7-2 VCO and sweep signal (beat)</div></div> <div><div>• Tuner</div><div>• TV broadcast</div></div> <div>• TV monitor</div> <div>• T4</div> <div><div>1) Use a sweeper probe as shown in Fig. 2-7-1 and connect the sweep generator output to pin 1 of SAW 1.</div><div>Adjust the sweep gain so that the waveform does not distort as observed with the oscilloscope.</div><div>Connect the oscilloscope to pin 17 of IC1 (VIDEO DET OUT) and adjust T4 to align the waveform with the frequency marker as shown in Fig. 2-7-2.</div></div> <div>Alternate method:</div> <div><div>1) Receive a colour broadcast on a VHF-HI channel.</div><div>2) Adjust T4 to obtain a fine picture on the monitor.</div></div>
<div>• Before the following adjustments:</div> <div><div>1. Connect a cable to ANT IN and terminate TV OUT at 75 <math>\Omega</math>.</div><div>2. Set a TV channel signal generator as follows.</div></div> <div><div>Video: 65 dB<math>\mu</math>/75 <math>\Omega</math>, colour bar 87.5% modulation</div><div>Audio: 55 dB<math>\mu</math>/75 <math>\Omega</math>, 1 kHz <math>\pm</math> 50 kHz deviation</div></div>						
2	RF AGC	• EE	• Tuner	• TV monitor	• R40	<div>1) Connect the oscilloscope to IF terminal of U/V Tuner (Front end). Adjust R40 for maximum level, then again adjust R40 for - 8 dB again.</div> <div>Alternate method:</div> <div>Note: Adjust R40 (RF AGC) to correct for excess noise in the picture or when streaky cross interference occurs due to strong electrical fields.</div> <div><div>1) Adjust R40 to minimize noise or streaks on the TV monitor.</div><div>2) Check for absence of abnormality on all channels.</div></div>

No.	Item	Mode	Signal & Setting	Measurement Point	Adjustment Parts	Adjustment Procedure
3	SOUND DET.	• EE	• Tuner • TV broadcast	• Across C40 (Audio out) Main board	• T2 (Sound det)	1) Use a adjustment circuit as shown in Fig. 2-7-3. and with AFC mode to NORM, connect a distortion meter as shown in Fig. 2-7-3. 2) Adjust T2 for minimum distortion (less than 1.5%).
						Purpose: Set for optimum audio level. Maladjustment: Audio level will either have a small sound or no sound.
						 <p>Fig. 2-7-3 Adjustment circuit</p>
				• Across C40 (Main board)		<b>Alternate method:</b> 1) Receive a color broadcast on a VHF-HI channel (7 to 13). Connect an oscilloscope to across C40 of the MAIN board. 2) Adjust T2 for maximum level at audio sound.
4	AFC	• EE	• Tuner • TV broadcast • AFC NORM by MENU	• A (Main board)	• T3 (AFC)	1) With AFC mode to NORM, connect oscilloscope to A of the MAIN board as shown in Fig. 2-7-4. 2) Set the oscilloscope to DC mode and adjust T2 to set the lower edge of the ripple waveform to $2.2 \pm 0.2$ V.
						Purpose: Keep the local oscillator in the receiver from drifting off proper tuning. (Set for optimum broadcast colour signal) Maladjustment: The picture will either have a beat or smear. In some cases it may disappear.
				• A (Main board)	• T3 (AFC)	<b>Alternate method:</b> 1) Receive a color broadcast on a VHF-HI channel (7 to 13). 2) With AFC mode to NORM, connect oscilloscope to A of the MAIN board as shown in Fig. 2-7-4. 3) Set the oscilloscope to DC mode and adjust T3 to set the lower edge of the ripple waveform to $2.2 \pm 0.2$ V.
						 <p>Fig. 2-7-4 Adjustment point</p>

## SECTION 3 CHARTS AND DIAGRAMS

### 3.1 CIRCUIT BOARD AND LOCATION



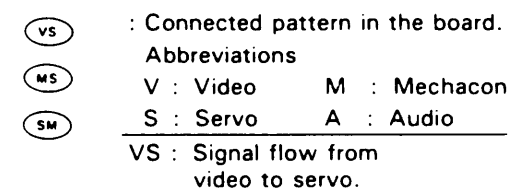
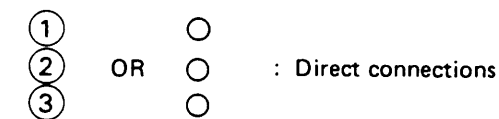
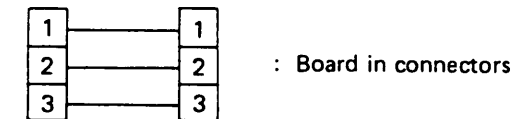
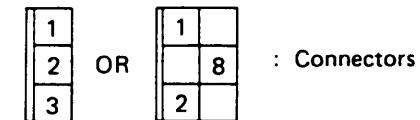
### 3.2 GENERAL INFORMATION

#### 3.2.1 Connections

##### Note:

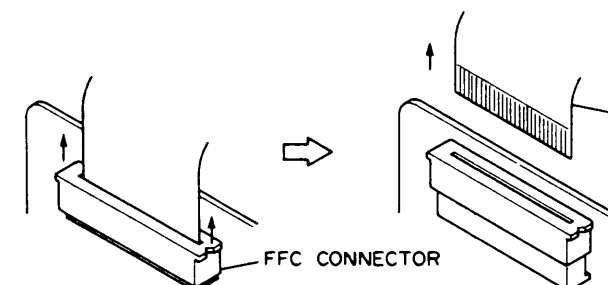
Unless otherwise specified, only signal input flow is indicated.

Connection arrows indicate only signal outputs.

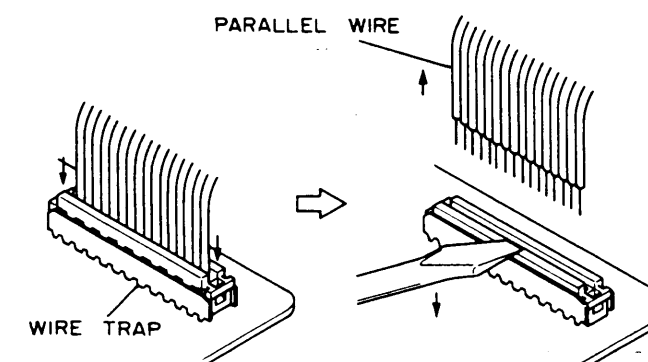


#### 3.2.2 Disconnecting the flatwire

1. Pull the connector structure upward to release the clamp when removing or inserting the flat wire cable.

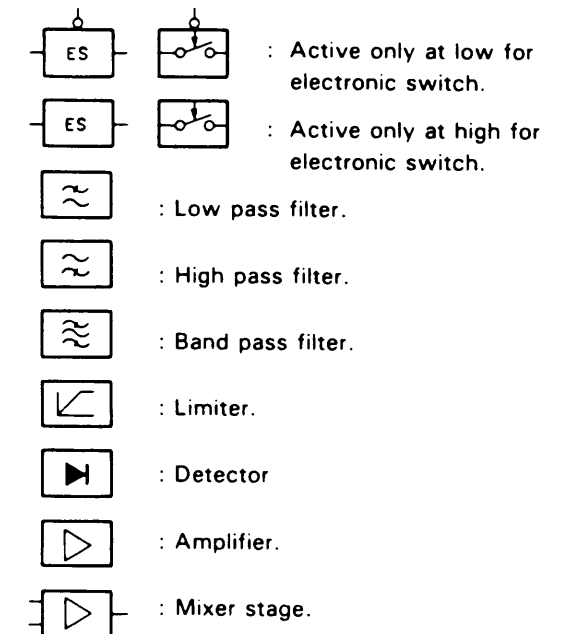


2. Depress the connector structure downward to release the clamp when removing or inserting the flat wire cable, as indicated below.



#### 3.2.3 Indications

AUX : Active only at high.  
AUX : Active only at low.  
AUX : Active only at middle.  
AUX : Active only at open.

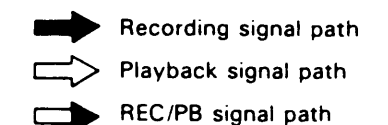


#### 3.2.4 Schematic diagram values

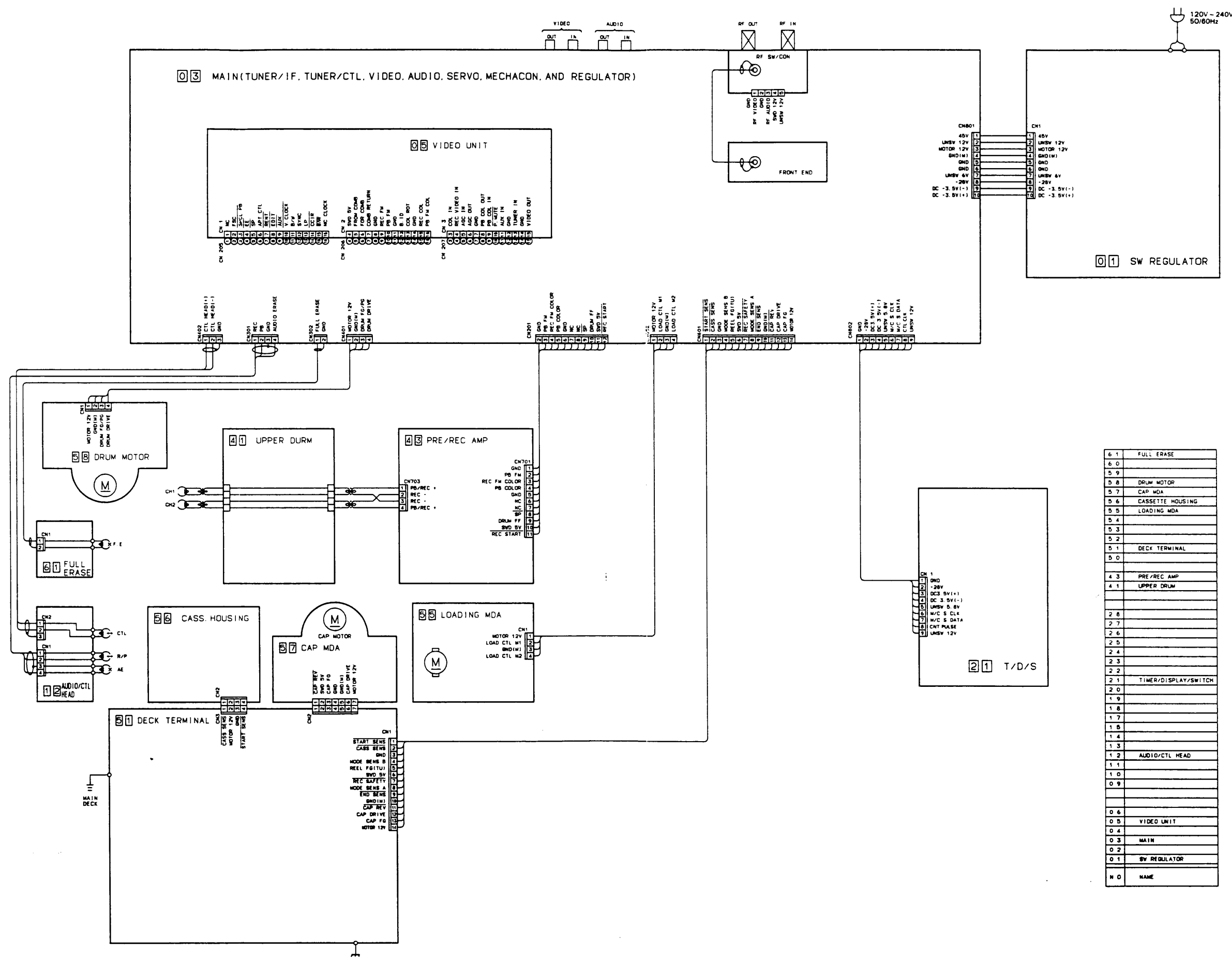
Unless otherwise specified.

1. All resistance values are in ohms, 1/6 W or 1/8 W (refer to parts list).
2. All capacitance values are in  $\mu$ F, (P; PF).
3. All inductance values are in  $\mu$ H, (m; mH).
4. All diodes are 1SS133 or MA165, (refer to parts list).
5. Voltages are DC-measured (reference to ground) with a digital voltmeter during recording (SP mode) and playback (SP mode) with alignment tape. Where voltages differ between recording and playback, the voltage during playback is shown in parenthesis.
6. Waveforms (VIDEO System) are measured (reference to ground) with a color bar during recording (SP mode) and playback (SP mode) with alignment tape.
7. Waveforms (AUDIO System) are measured (reference to ground) with 1 kHz (-8 dBs) during recording and playback with alignment tape (1 kHz).
8. Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

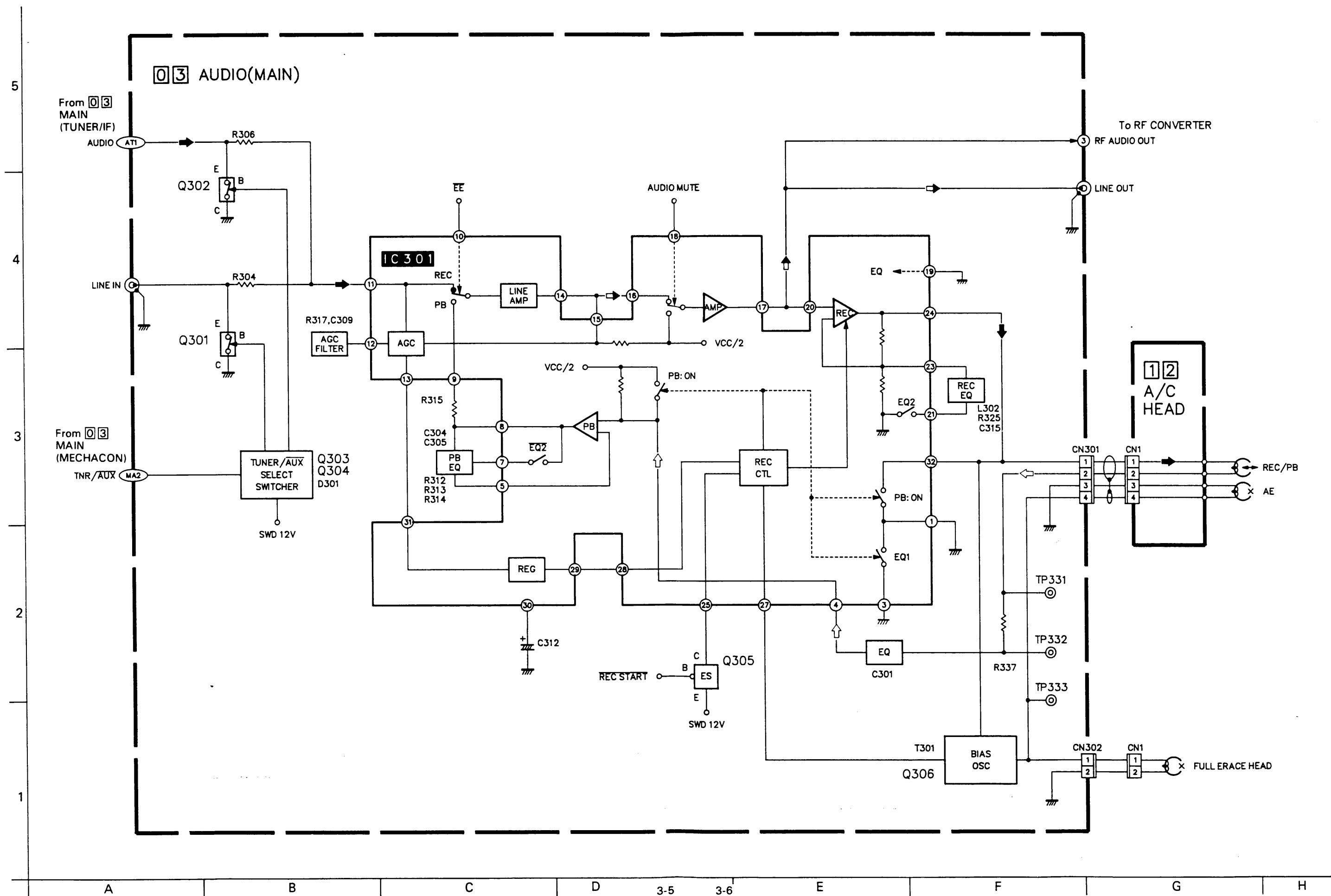
#### 3.2.5 Signal flow in the schematic



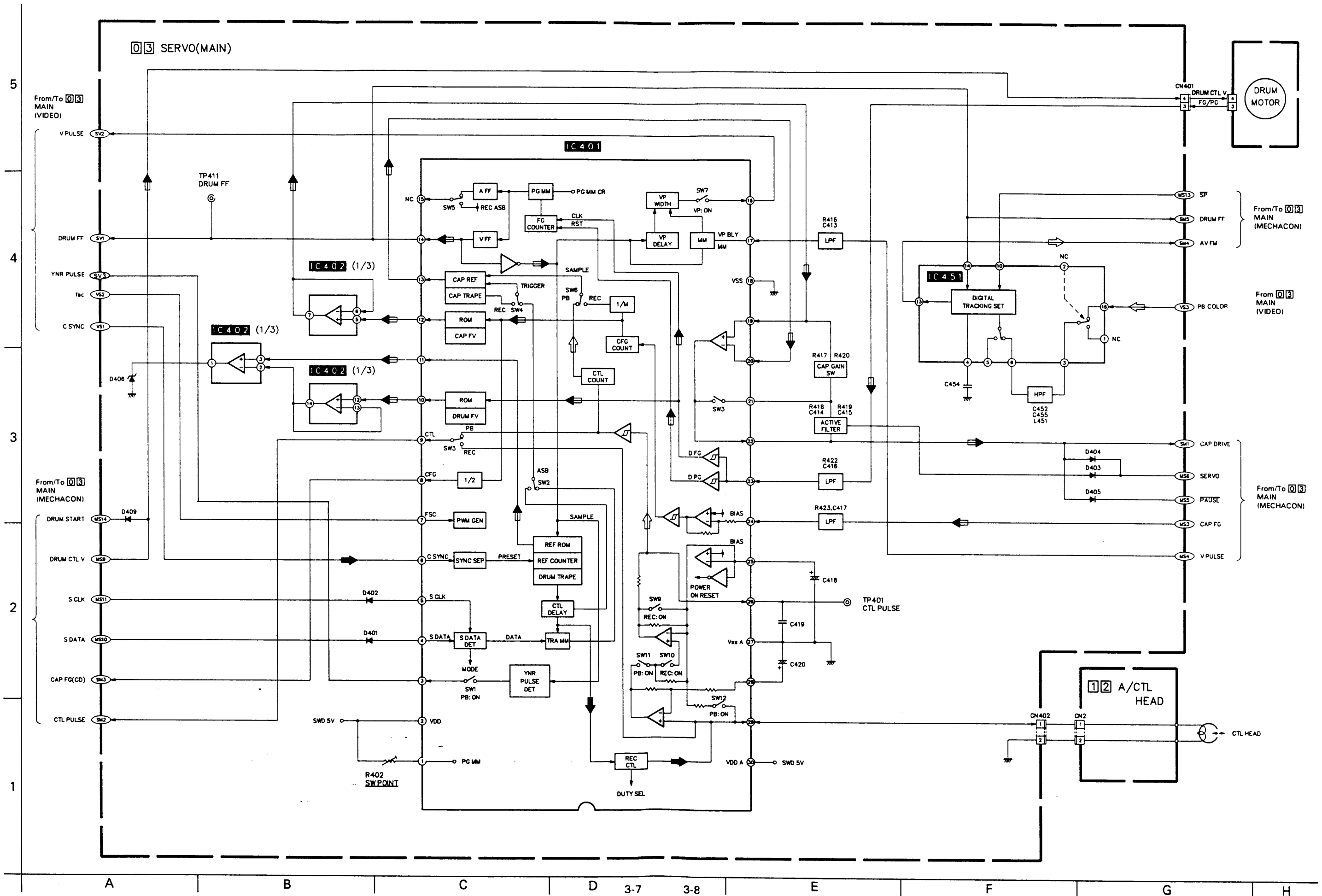
3.3 BOARD INTERCONNECTIONS



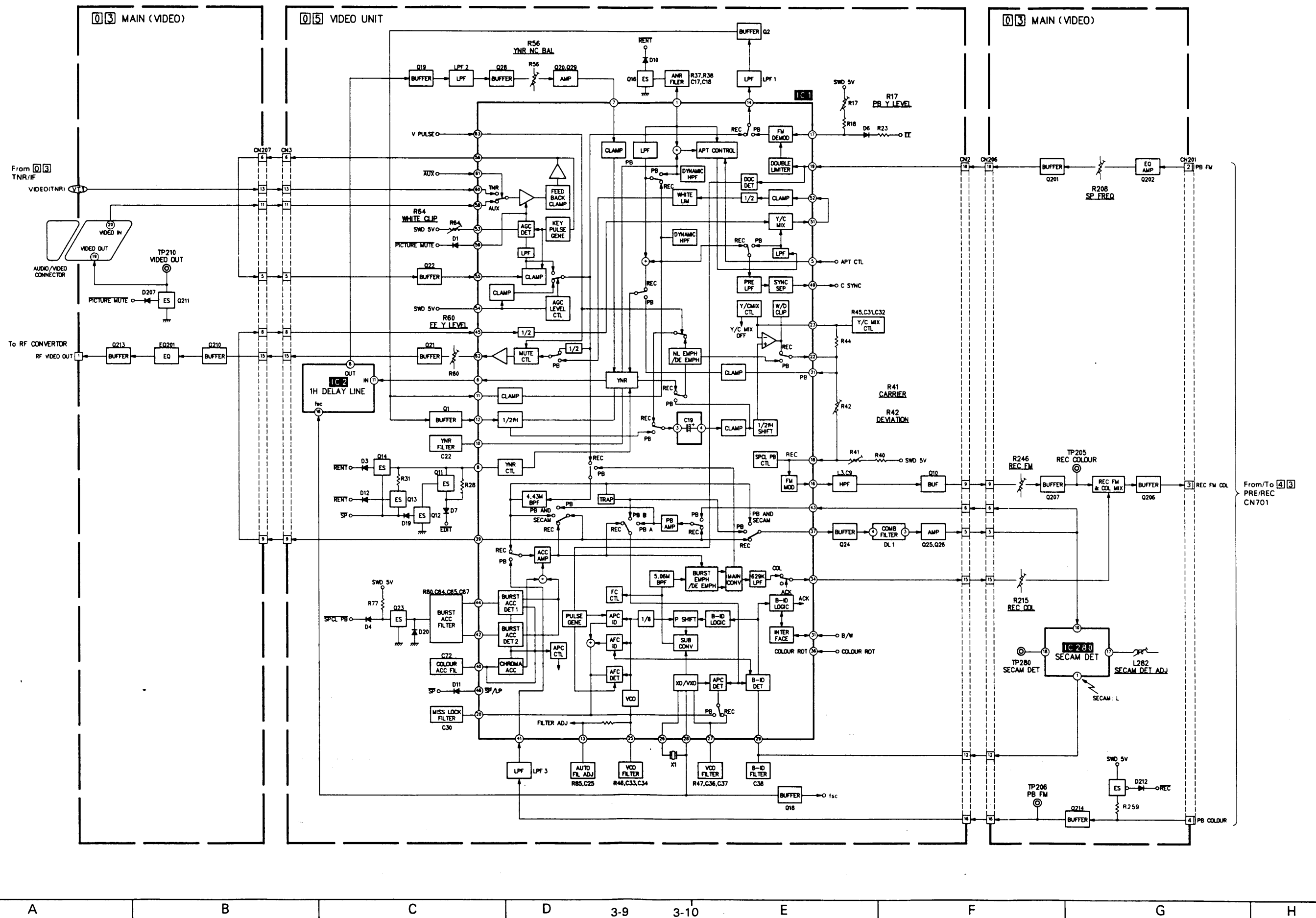
### 3.4 AUDIO BLOCK DIAGRAM



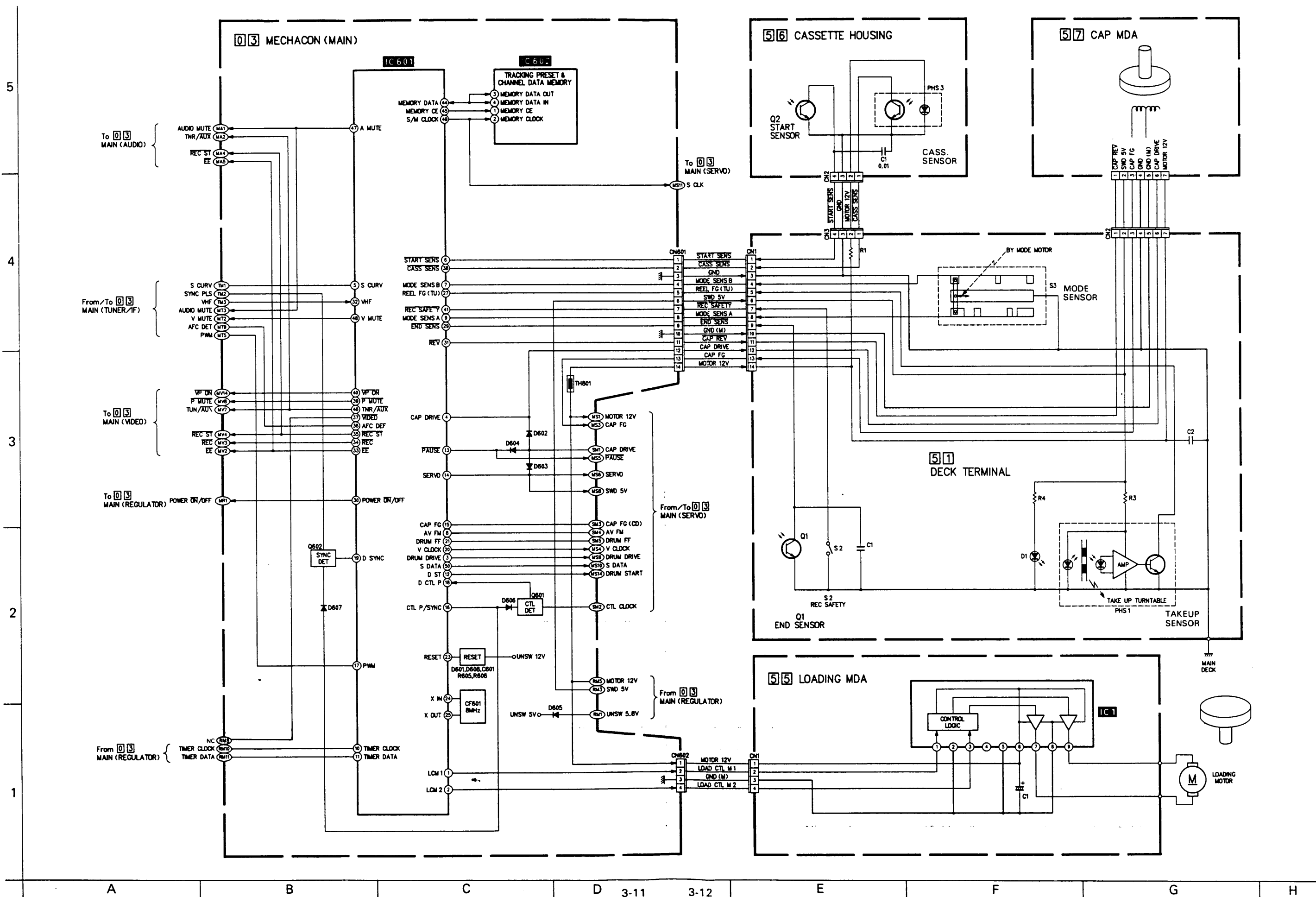
### 3.5 SERVO BLOCK DIAGRAM



### 3.6 VIDEO BLOCK DIAGRAM

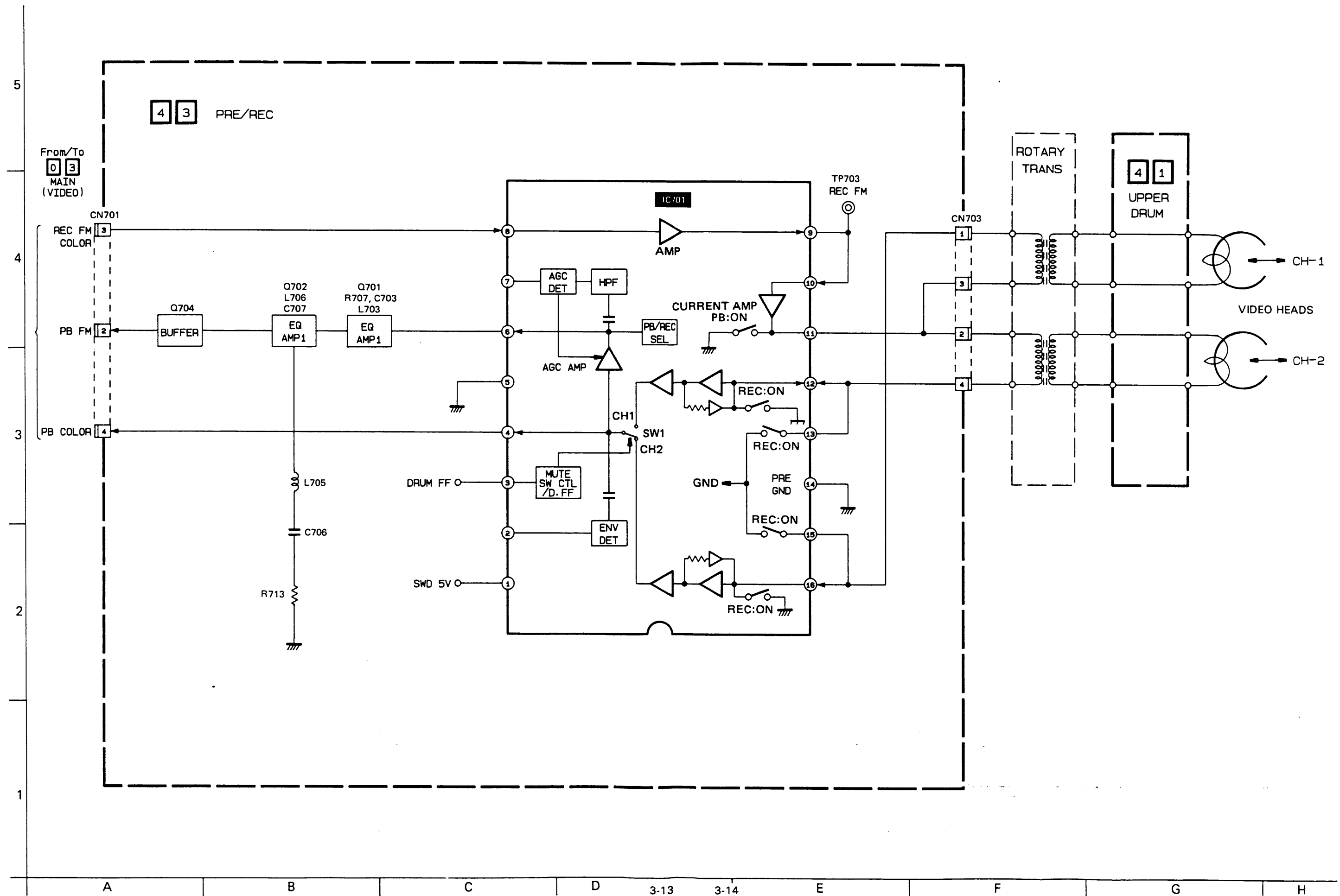


### 3.7 SYSTEM BLOCK DIAGRAM



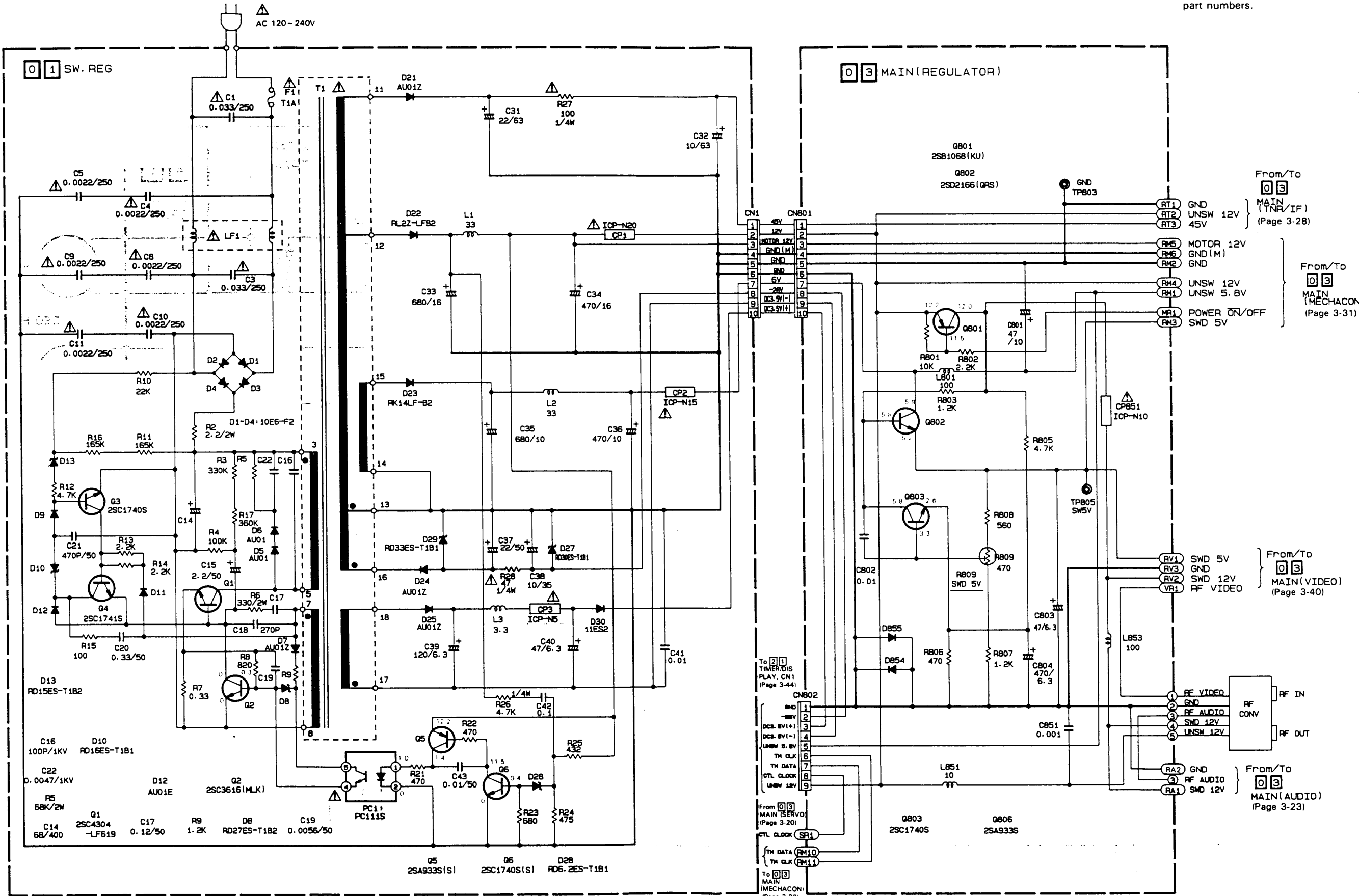


### 3.8 PRE/REC BLOCK DIAGRAM



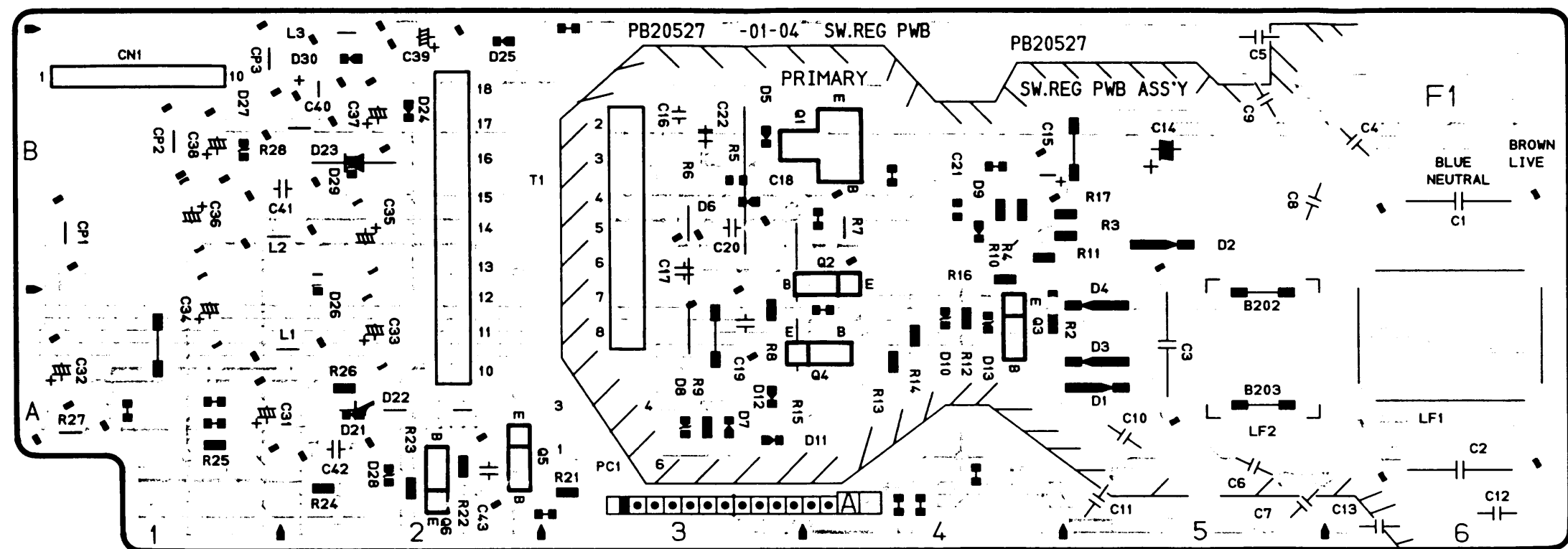
3.9 SWITCH REGULATOR AND REGULATOR (MAIN) SCHEMATIC DIAGRAMS

NOTE: Shaded ( ) parts are critical for safety. Replace only with specified part numbers.

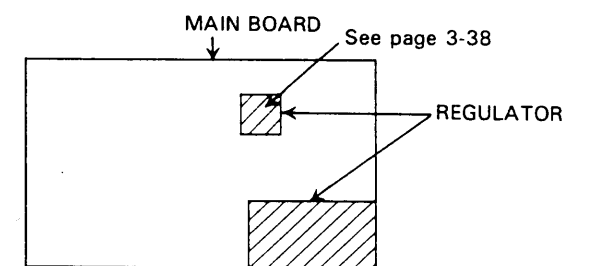
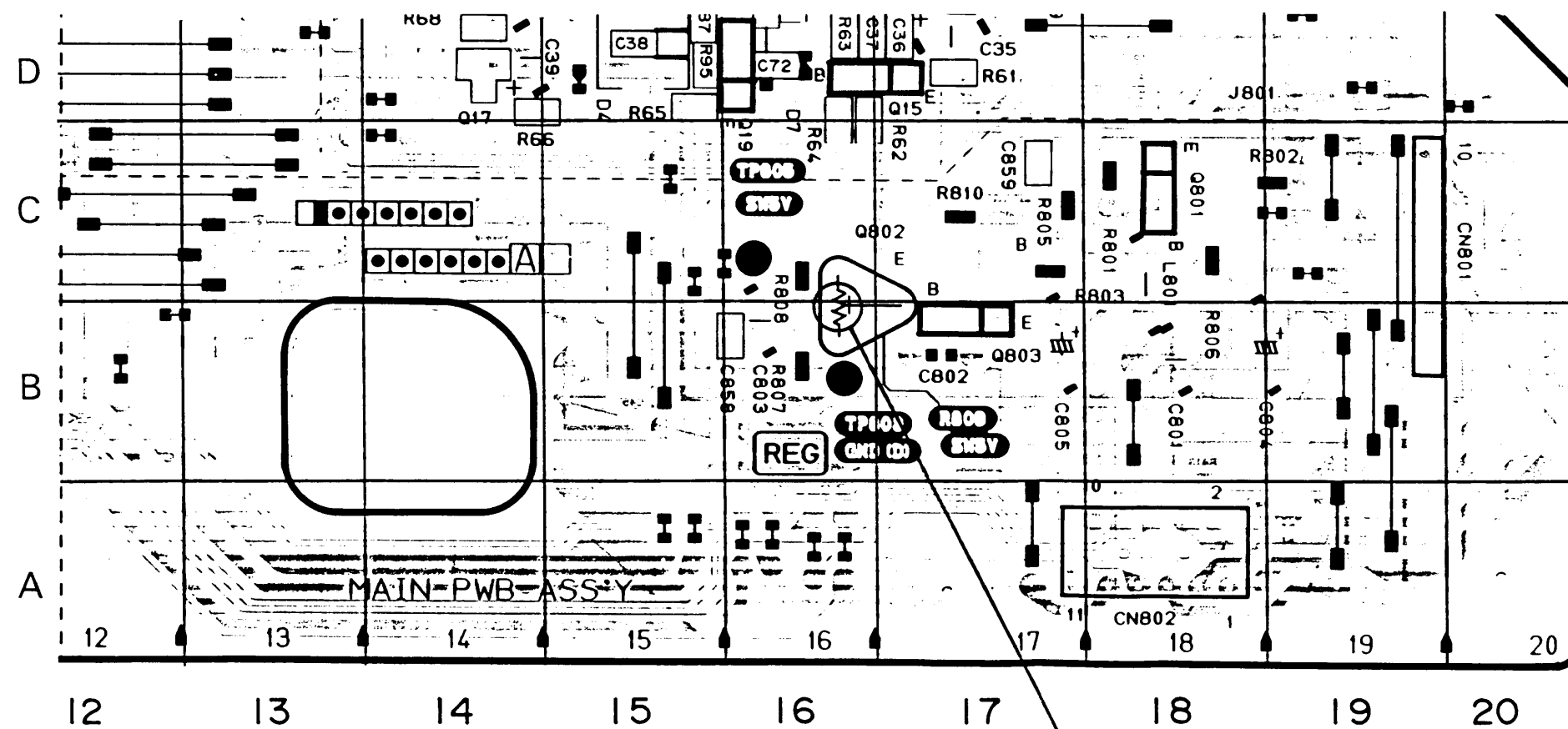


### 3.10 SWITCHING REGULATOR CIRCUIT BOARD

—SW REGULATOR—



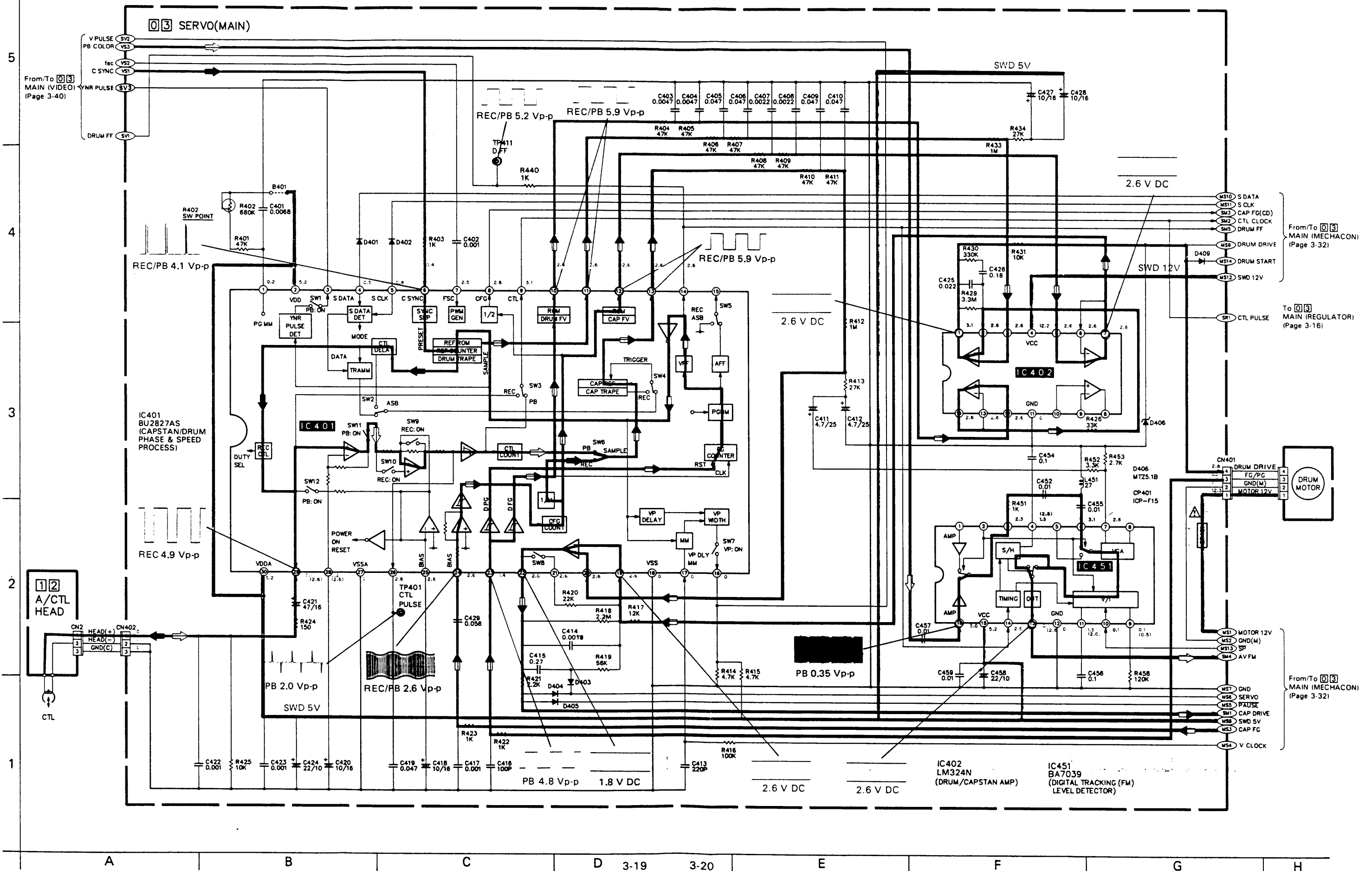
—REGULATOR (MAIN)—



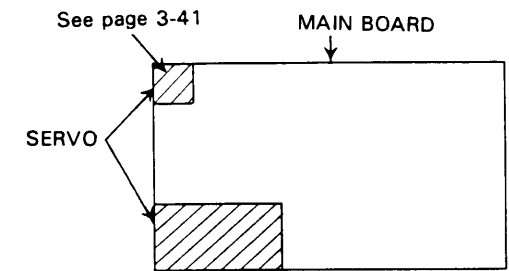
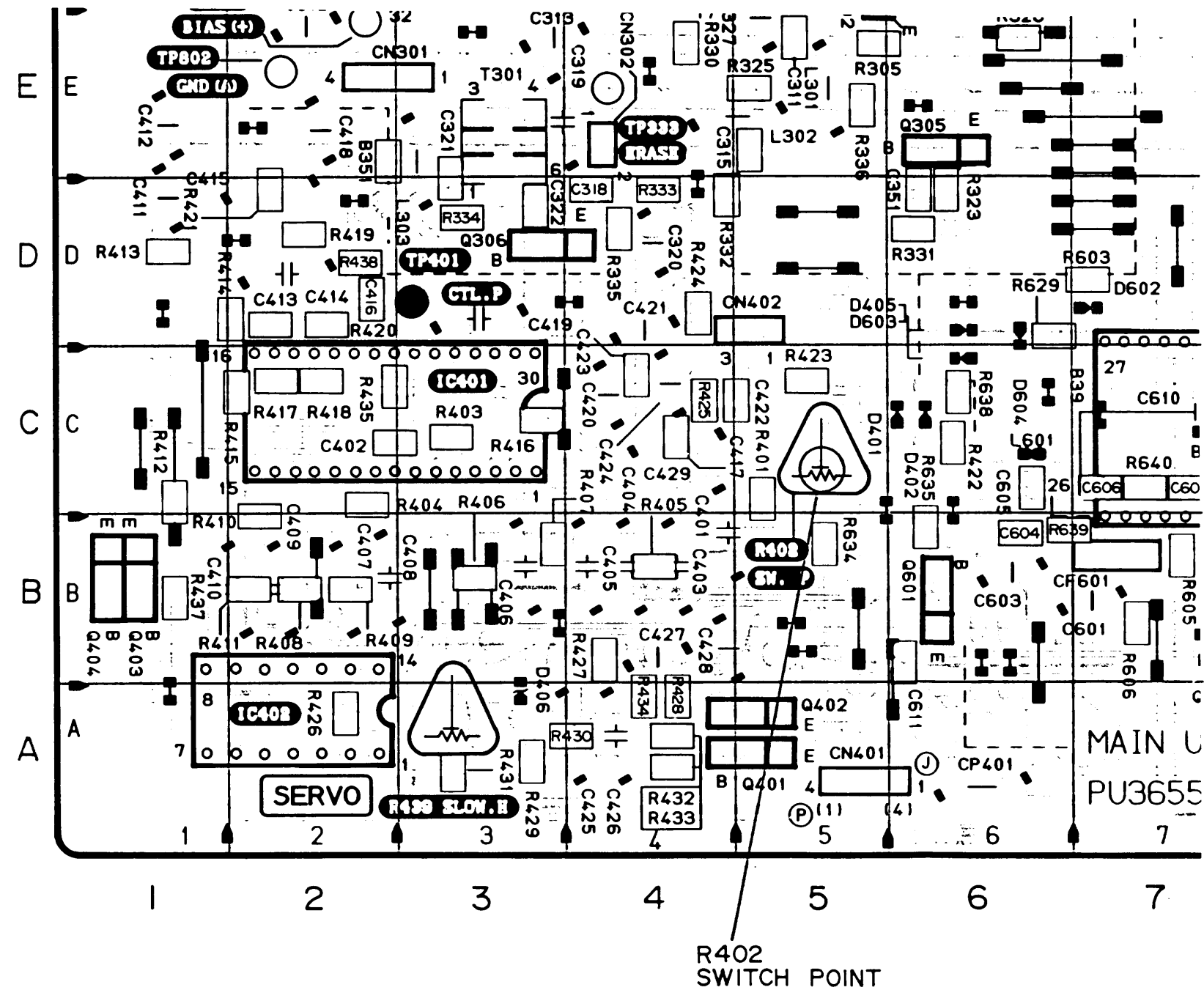
• MAIN board assembly is located in page 3-37,38

R809  
SWD 5V

### 3.11 SERVO SCHEMATIC DIAGRAM



3.12 SERVO (MAIN) CIRCUIT BOARD



• MAIN board assembly is located in page 3-37,38

• Only chip parts

REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR	
R401	C5	R452	J2
R403	C3	R453	I2
R404	B2	R458	K1
R406	B3		
R407	B3	CAPACITOR	
R408	B2		
R409	B2		
R410	C2	C402	C2
R411	B2	C413	D2
R412	C1	C416	D2
R413	D1	C417	C4
R414	D1	C422	C4
R415	C2	C423	C4
R416	C3	C452	J3
R417	C2	C455	J2
R418	C2	C457	J3
R419	D2	C459	K2
R420	D2		
R421	D2		
R422	C6		
R423	C5		
R424	D4		
R425	C4		
R426	A2		
R429	A3		
R430	A3		
R431	A3		
R433	A4		
R434	A4		
R440	H1		
R451	J2		

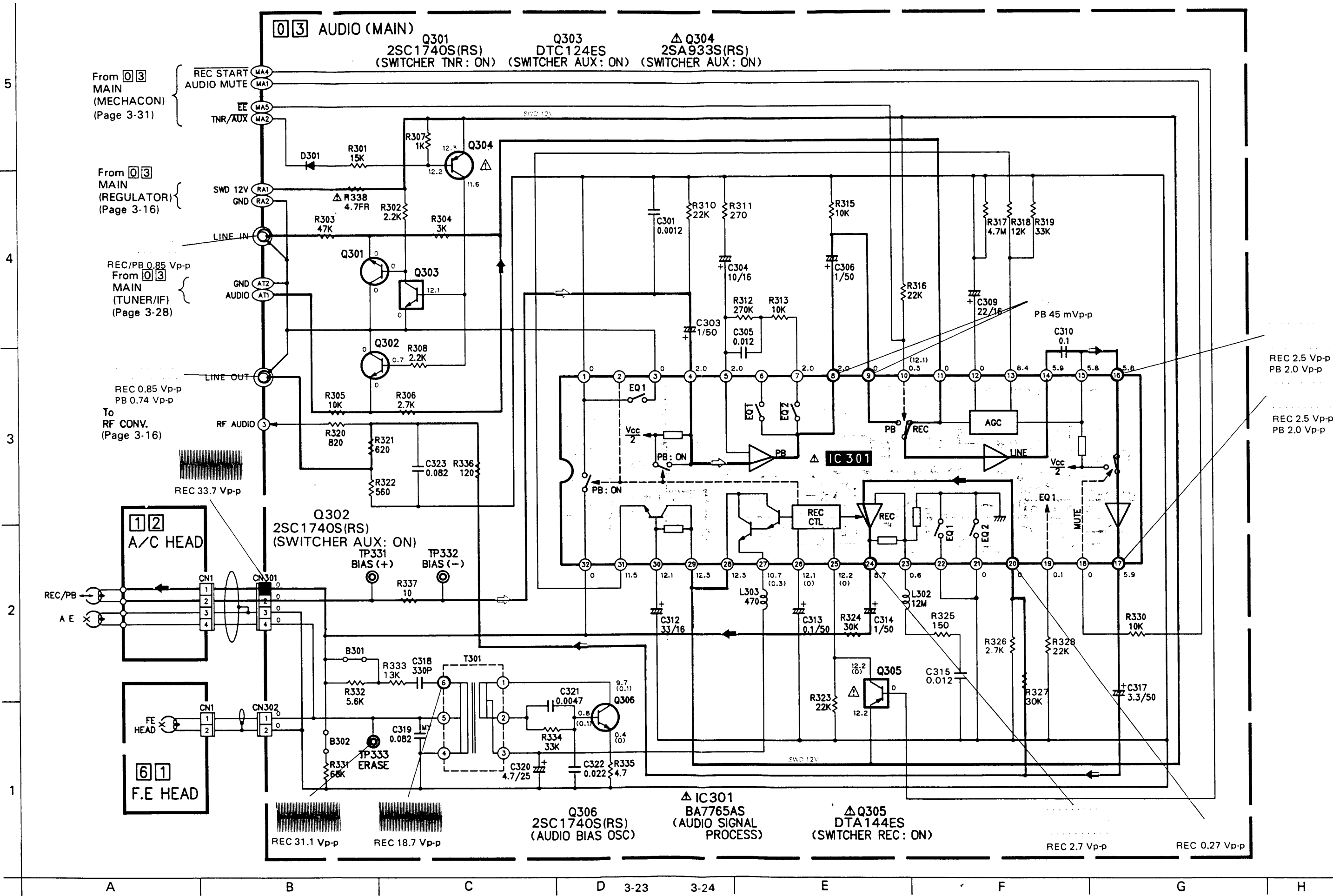
see page 3-37

see page 3-37

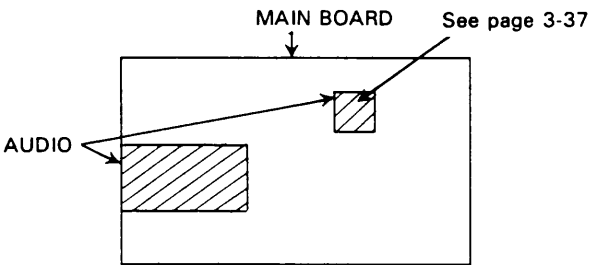
see page 3-37

3.13 AUDIO SCHEMATIC DIAGRAM

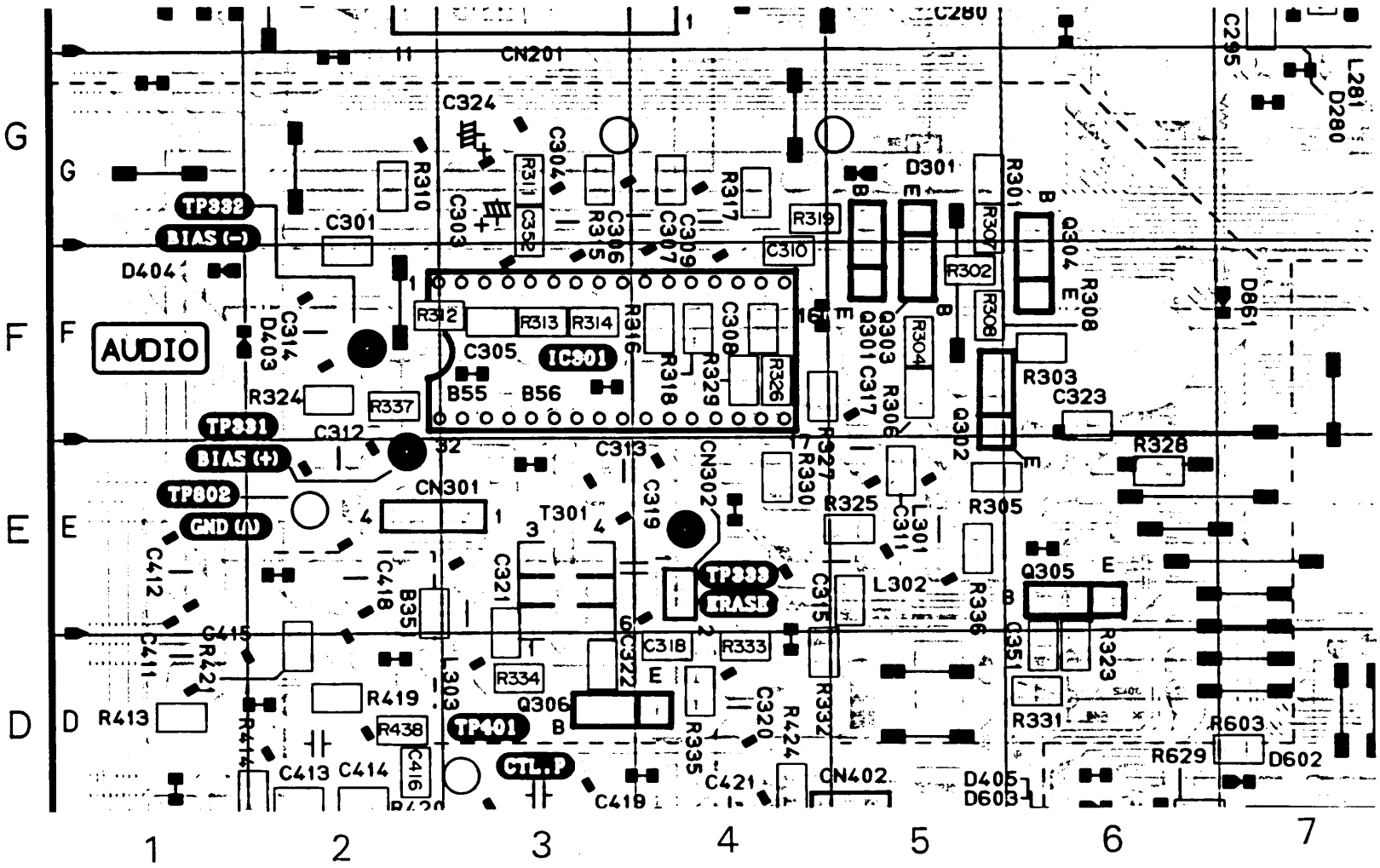
NOTE: Shaded ( ) parts are critical for safety. Replace only with specified part numbers.



3.14 AUDIO (MAIN) CIRCUIT BOARD



• MAIN board assembly is located in page 3-37,38

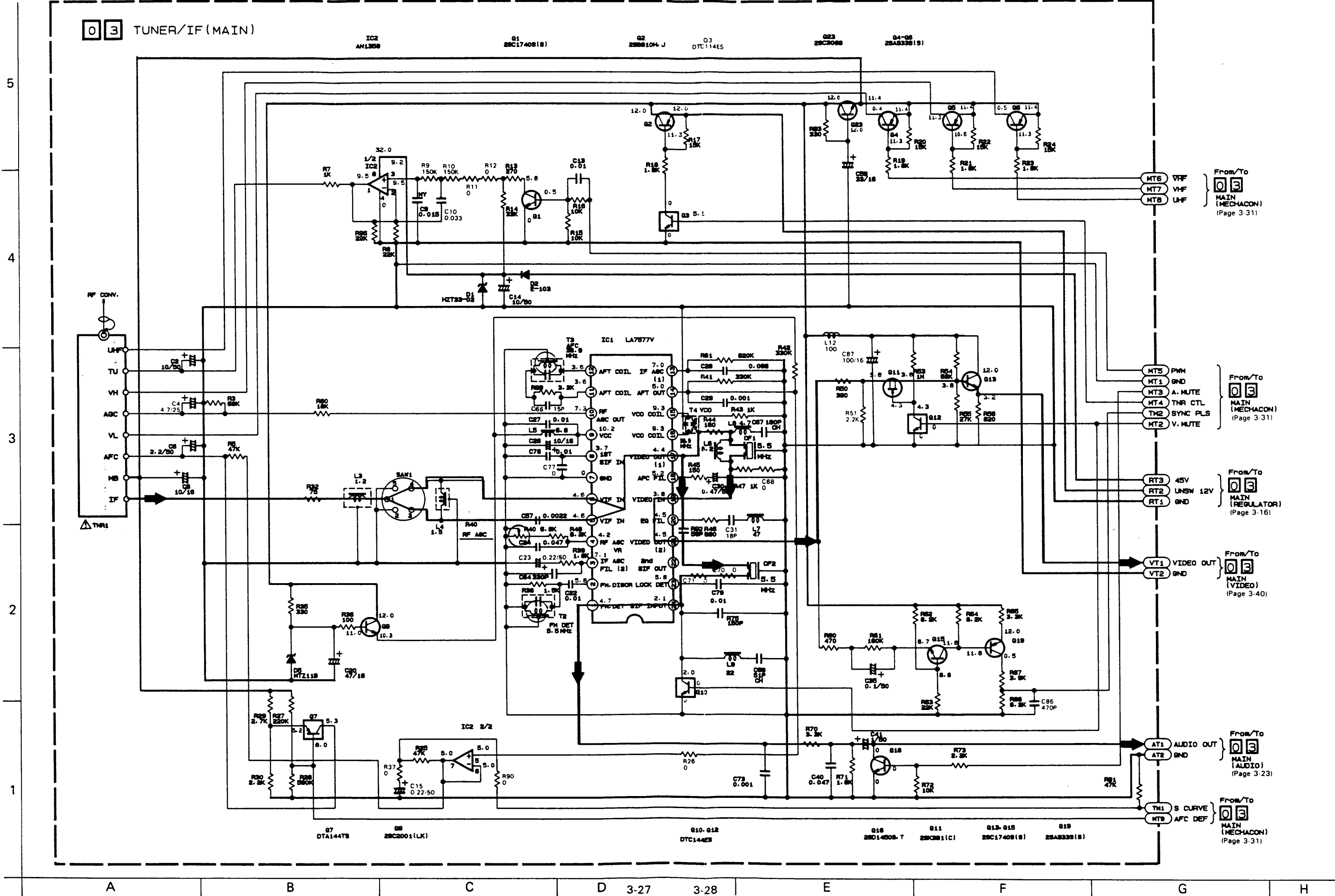


• Only chip parts

REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR	
R301	G5	R335	D4
R302	F5	R336	E5
R303	F6	R337	F2
R304	F5	CAPACITOR	
R305	E5		
R306	F5	C301	F2
R307	G5	C305	F3
R308	F5	C310	G4
R310	G2	C315	E5
R311	G3	C318	D4
R312	F2	C321	E3
R313	F3	C322	D3
R315	G3	C323	F6
R316	F4		
R317	G4		
R318	F4		
R319	G4		
R320	I12		
R321	I12		
R322	J12		
R323	D6		
R324	F2		
R325	E5		
R326	F4		
R327	F4		
R328	E6		
R330	E4		
R331	D6		
R332	D4		
R333	D4		
R334	D3		

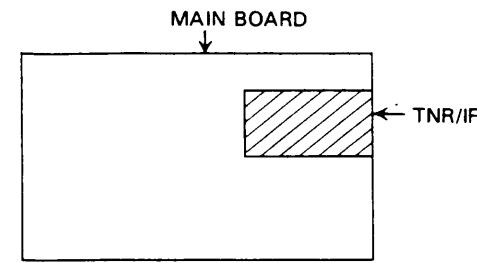
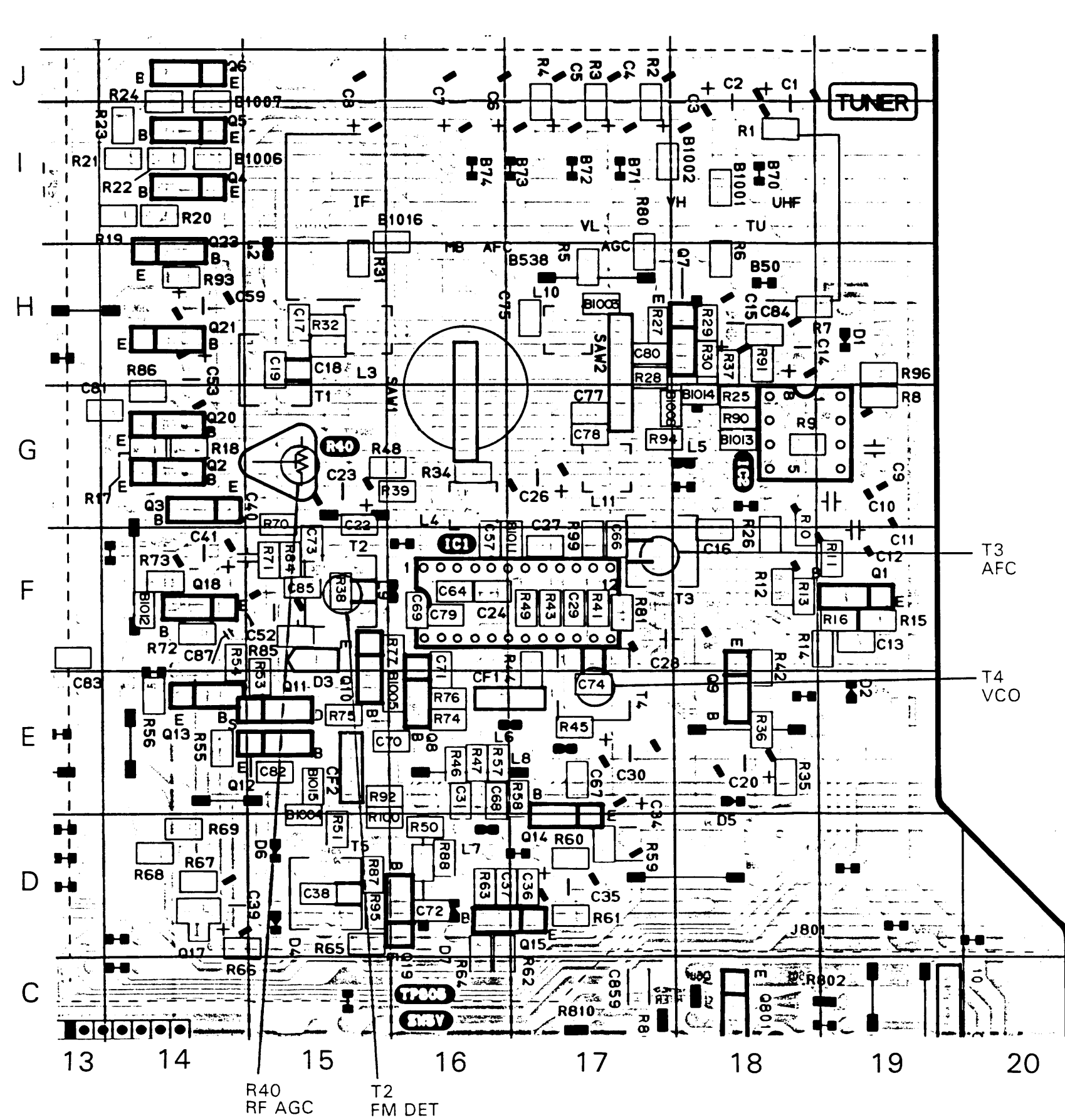
see page 3-38

3.15 TUNER/IF (MAIN) SCHEMATIC DIAGRAM





3.16 TUNER/IF (MAIN) CIRCUIT BOARD

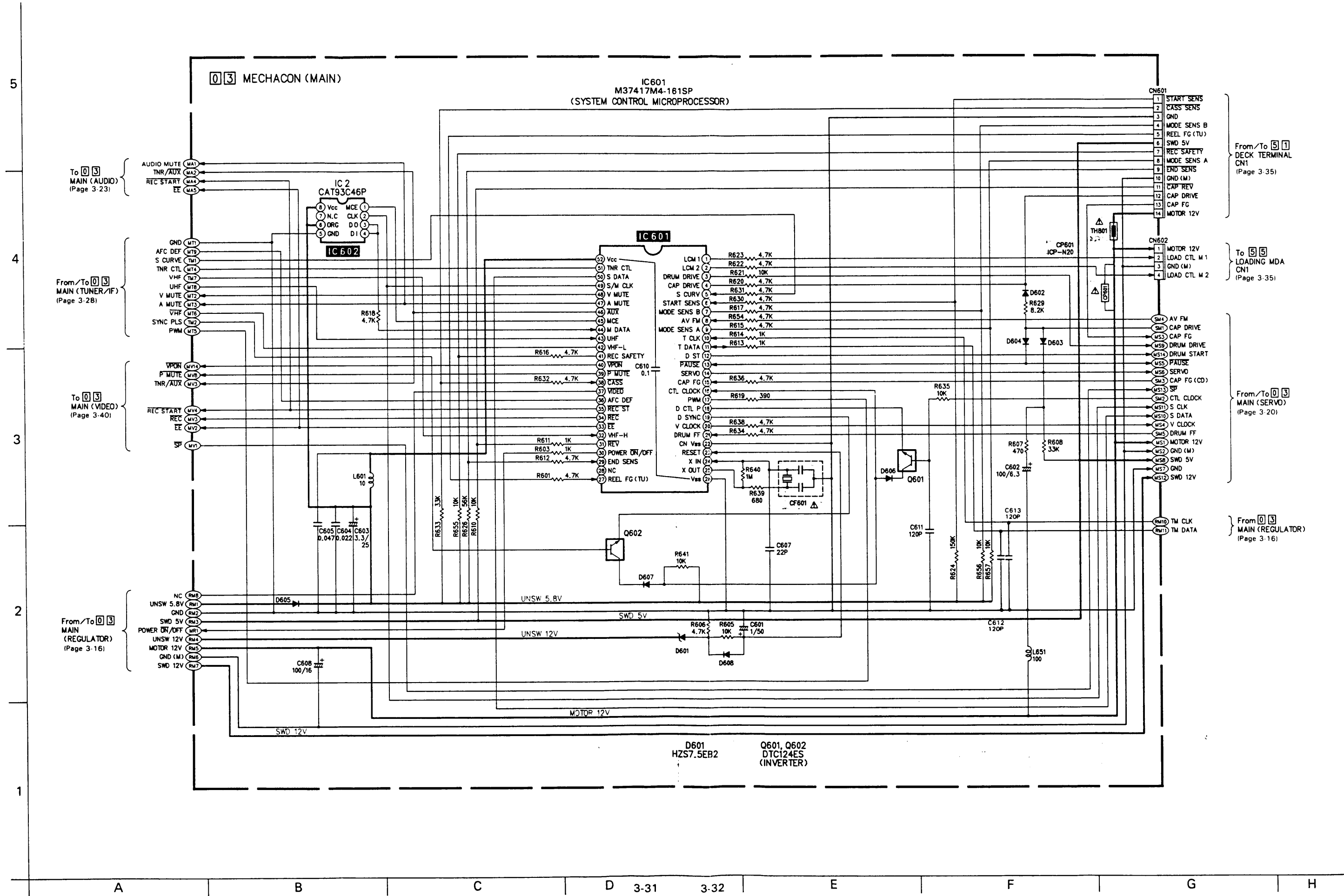


• MAIN board assembly is located in page 3-37,38

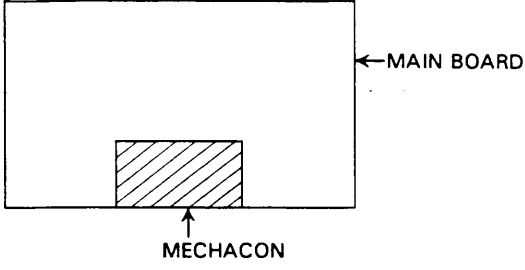
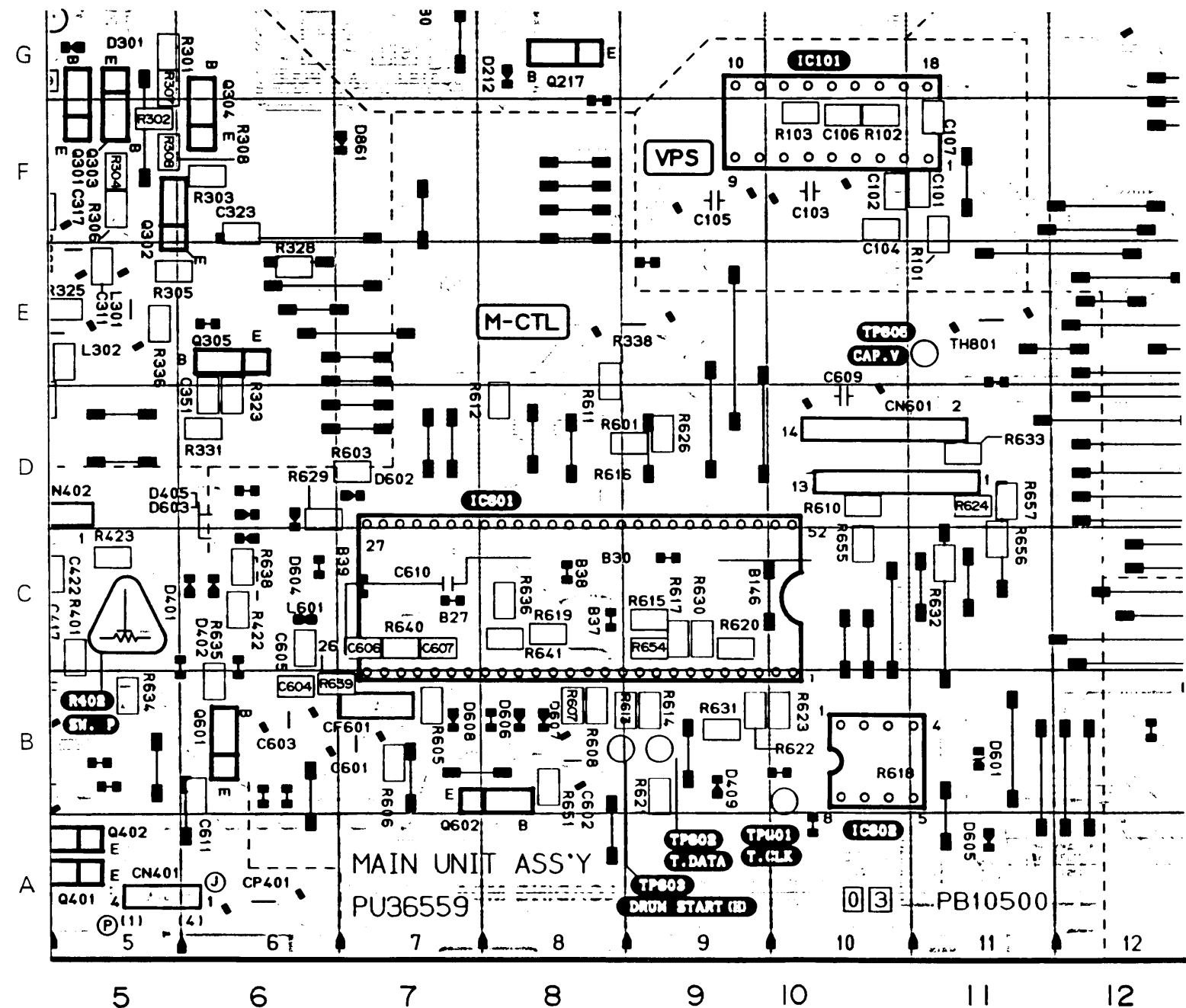
• Only chip parts

REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR		RESISTOR	
R3	I17	R39	G16	R91	H18
R5	H17	R41	F17	R92	E15
R7	H18	R42	E18	R93	H14
R8	G19	R43	F17	R96	H19
R9	G18	R44	E17	R99	F17
R10	F18	R45	E17		
R11	F19	R46	E16		
R12	F18	R47	E16	CAPACITOR	
R13	F18	R48	G16		
R14	F18	R50	D16	C13	F19
R15	F19	R51	D15	C22	G15
R16	F19	R53	E15	C24	F16
R17	G14	R54	F14	C27	F17
R18	G14	R55	E14	C29	F17
R19	I14	R56	E14	C31	E16
R20	I14	R60	D17	C57	F16
R21	I14	R61	D17	C64	F16
R22	I14	R62	C16	C66	F17
R23	I14	R63	D16	C67	E17
R24	I14	R64	C16	C68	E16
R25	G18	R65	D15	C69	F16
R26	F18	R70	G15	C70	E16
R27	H17	R71	F15	C71	E16
R28	H17	R72	F14	C73	F15
R29	H18	R73	F14	C77	G17
R30	H18	R75	E15	C78	G17
R32	H15	R80	H17	C79	F16
R35	E18	R81	F17	C82	E15
R36	E18	R87	D15	C83	F13
R37	H18	R88	D16	C84	H18
R38	F15	R90	G18		

3.17 MECHACON SCHEMATIC DIAGRAM



3.18 MECHACON (MAIN) CIRCUIT BOARD

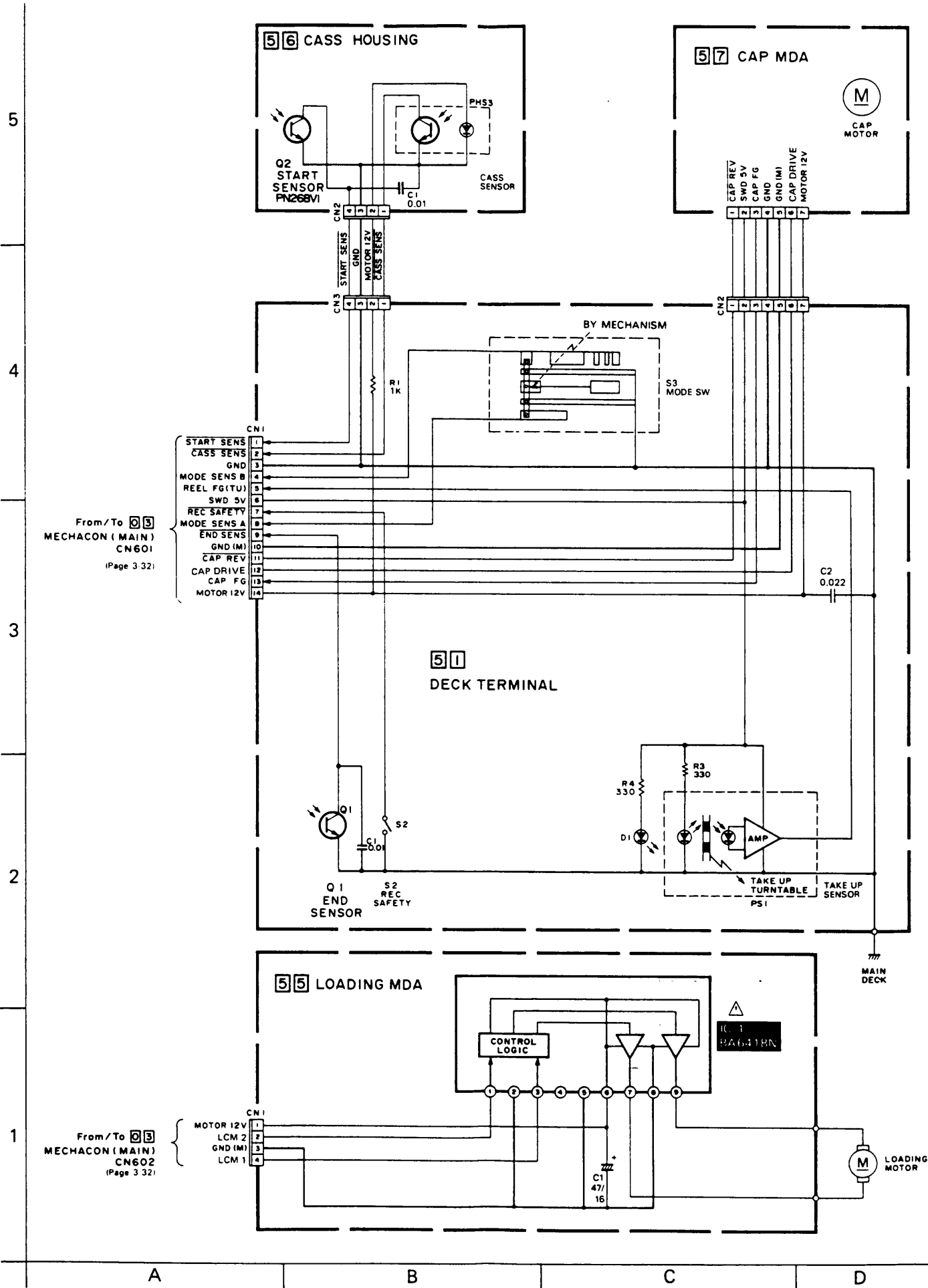


• MAIN board assembly is located in page 3-37,38

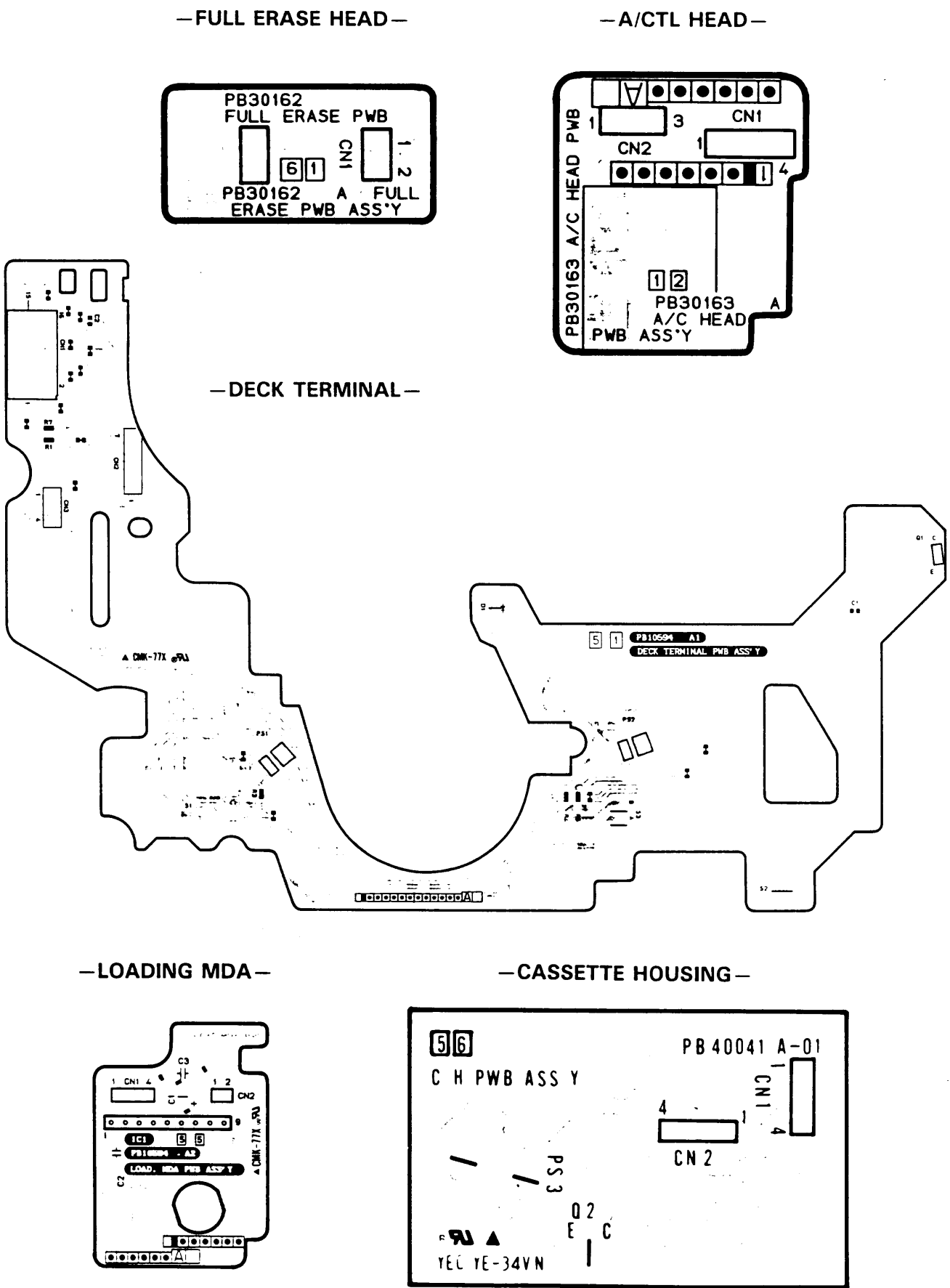
• Only chip parts

REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR	
R601	D9	R635	B6
R603	D7	R636	C8
R605	B7	R638	C6
R606	B7	R639	B6
R607	B8	R640	C7
R608	B8	R641	C8
R610	D10	R654	C9
R611	D8	R655	C10
R612	D8	R656	C11
R613	B8	R657	D11
R614	B9	CAPACITOR	
R615	C9		
R616	D8	CAPACITOR	
R617	C9		
R618	B10		
R619	C8		
R620	C9		
R621	B9		
R622	B9		
R623	B10		
R624	D11		
R626	D9		
R629	D6		
R630	C9		
R631	B9		
R632	C11		
R633	D11		
R634	B5		

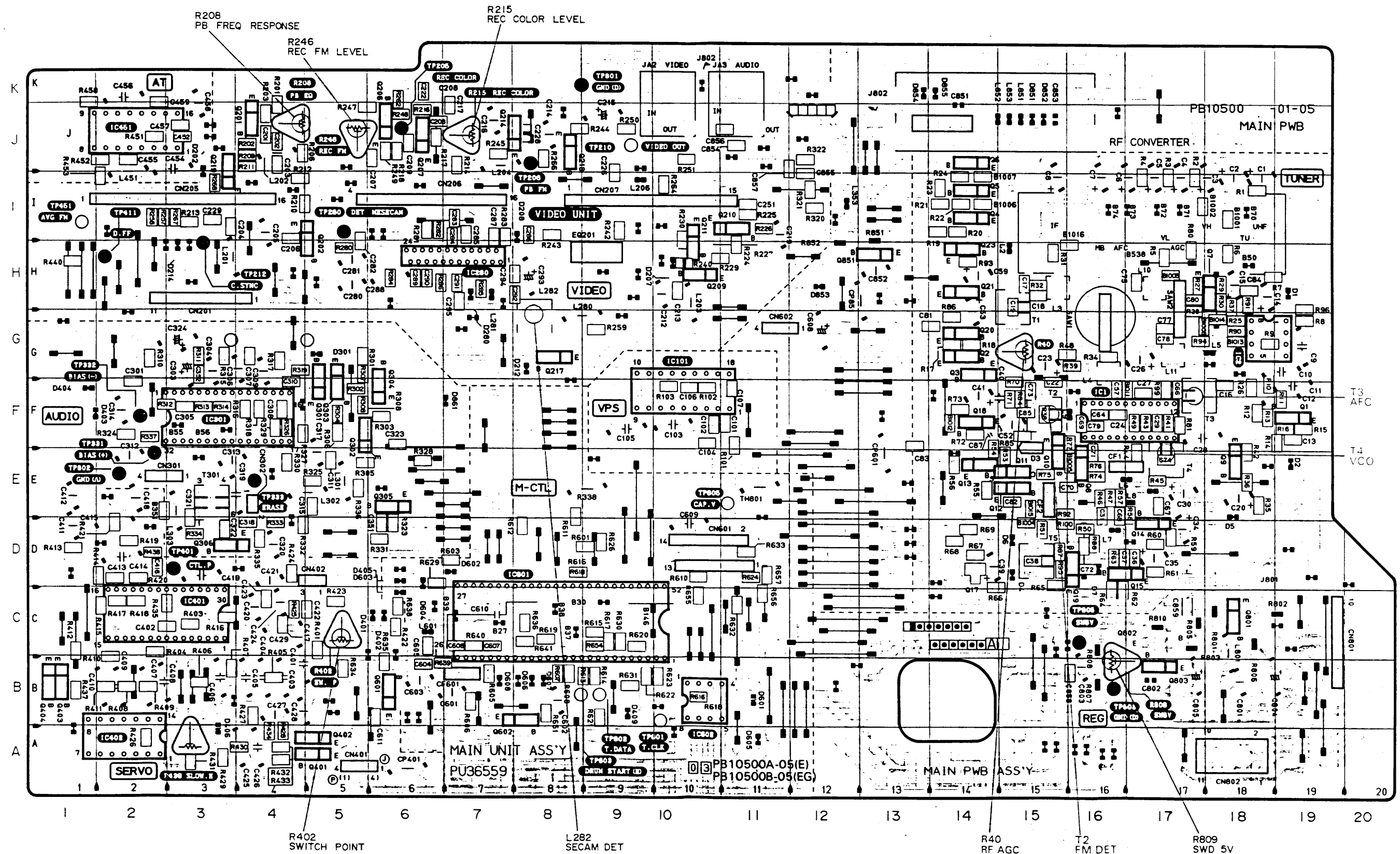
3.19 DECK TERMINAL, CASS. HOUSING, CAPSTAN MDA AND  
LOADING MDA SCHEMATIC DIAGRAMS



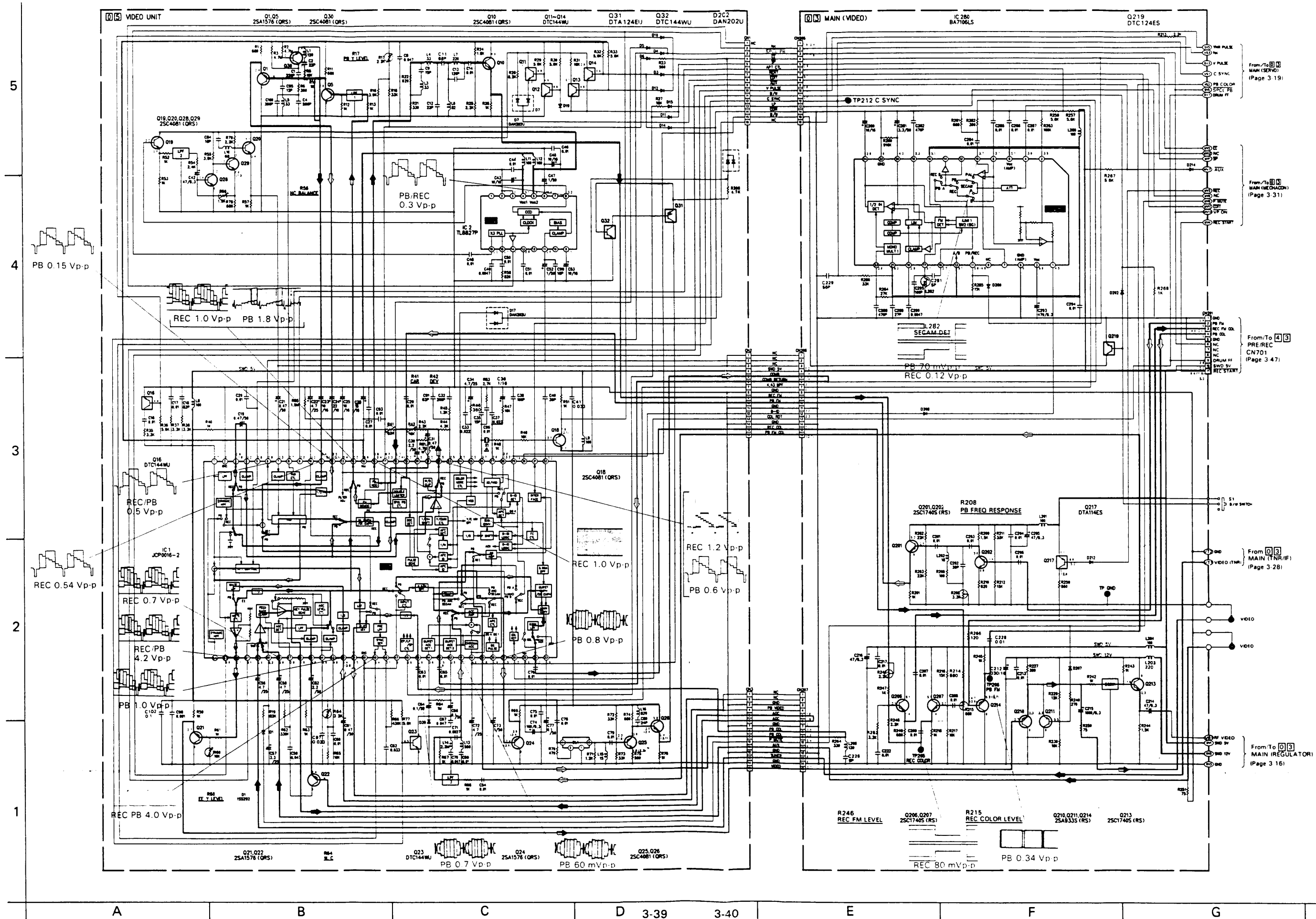
3.20 DECK TERMINAL, LOADING MDA, CASS. HOUSING, A/CTL  
HEAD AND FULL ERASE HEAD CIRCUIT BOARDS



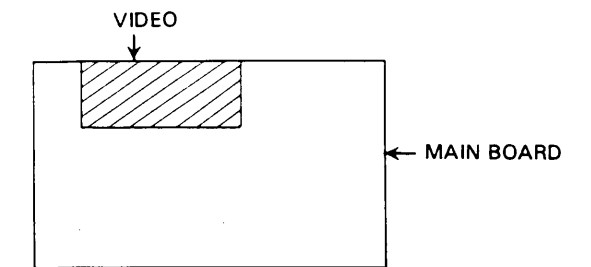
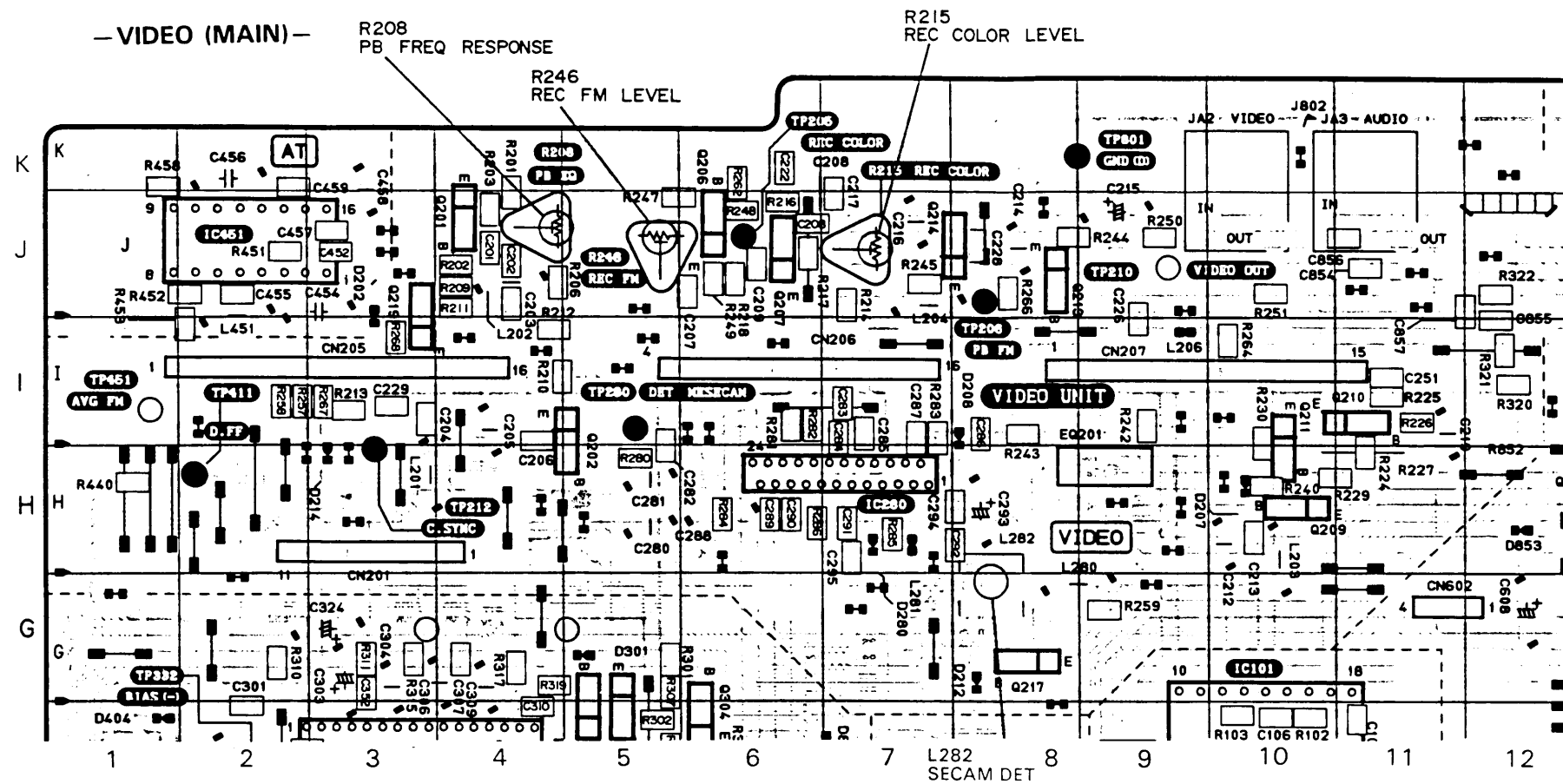
### 3.21 MAIN (AUDIO, SERVO, VIDEO, MECHACON, TUNER/IF) CIRCUIT BOARD



### 3.22 VIDEO UNIT AND VIDEO SCHEMATIC DIAGRAMS



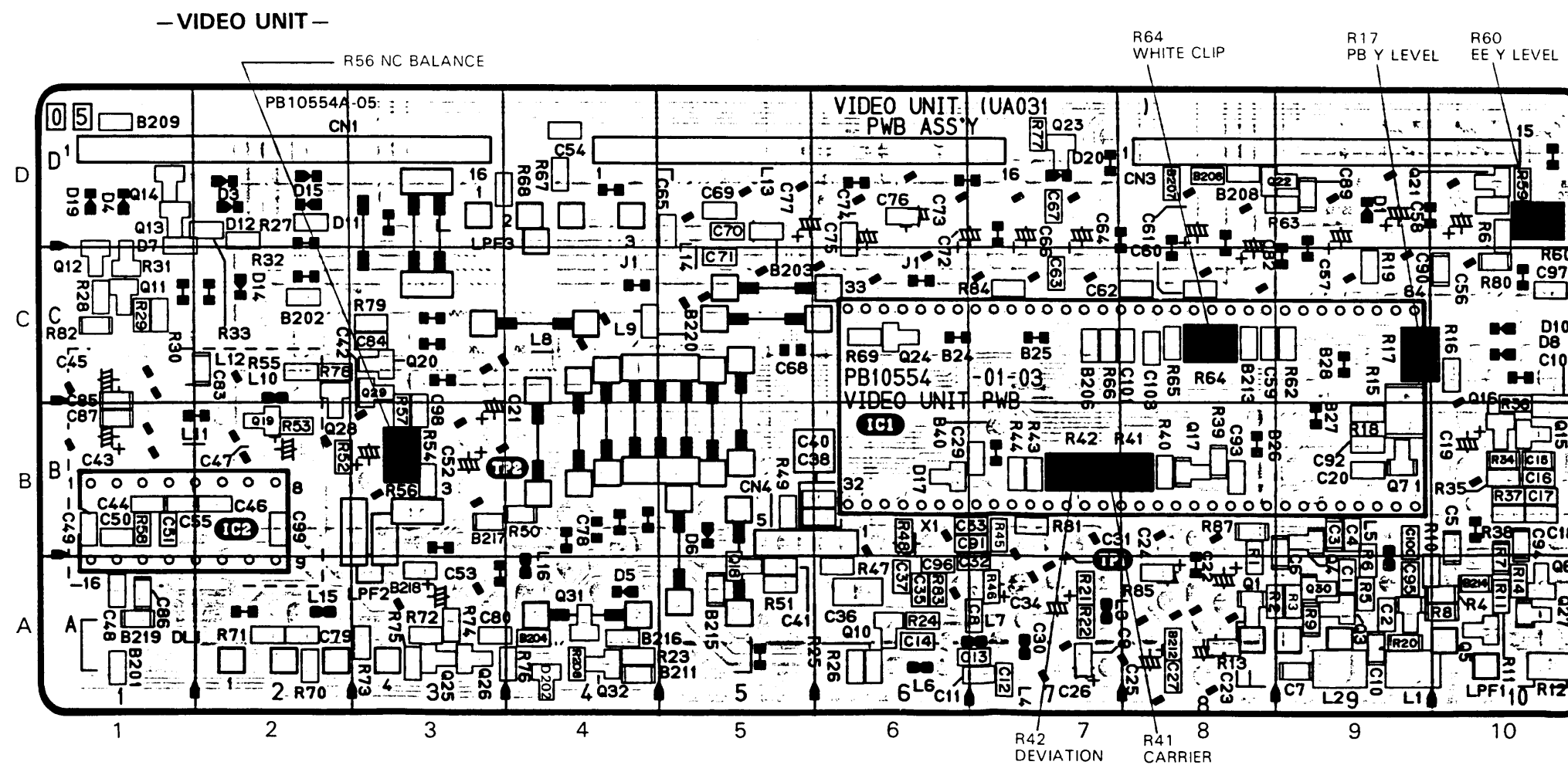
### 3.23 VIDEO (MAIN) AND VIDEO UNIT CIRCUIT BOARDS



- MAIN board assembly is located in page 3-37,38

- Only chip parts

REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR		CAPACITOR		CAPACITOR	
R201	K4	R249	J6	C201	J4	C294	H7
R202	J4	R250	J9	C202	J4	C295	H7
R203	J4	R251	J10	C203	J4		
R206	J4	R257	I2	C204	I3		
R209	J4	R258	I2	C206	I4		
R210	I4	R259	G9	C207	J6		
R211	J4	R262	K6	C208	J6		
R212	I4	R264	I10	C209	J6		
R213	I3	R266	J8	C213	H10		
R214	J7	R267	I3	C217	K7		
R216	J6	R268	I3	C222	K6		
R217	J6	R280	H5	C226	I9		
R218	J6	R281	I6	C228	J8		
R229	H10	R282	I6	C229	I3		
R230	H10	R283	I7	C282	H5		
R240	H10	R284	H6	C284	I7		
R242	I9	R285	H7	C285	I7		
R243	I8	R286	H6	C286	I8		
R244	J8			C287	I7		
R245	J7			C289	H6		
R247	J5			C290	H6		
R248	J6			C291	H7		



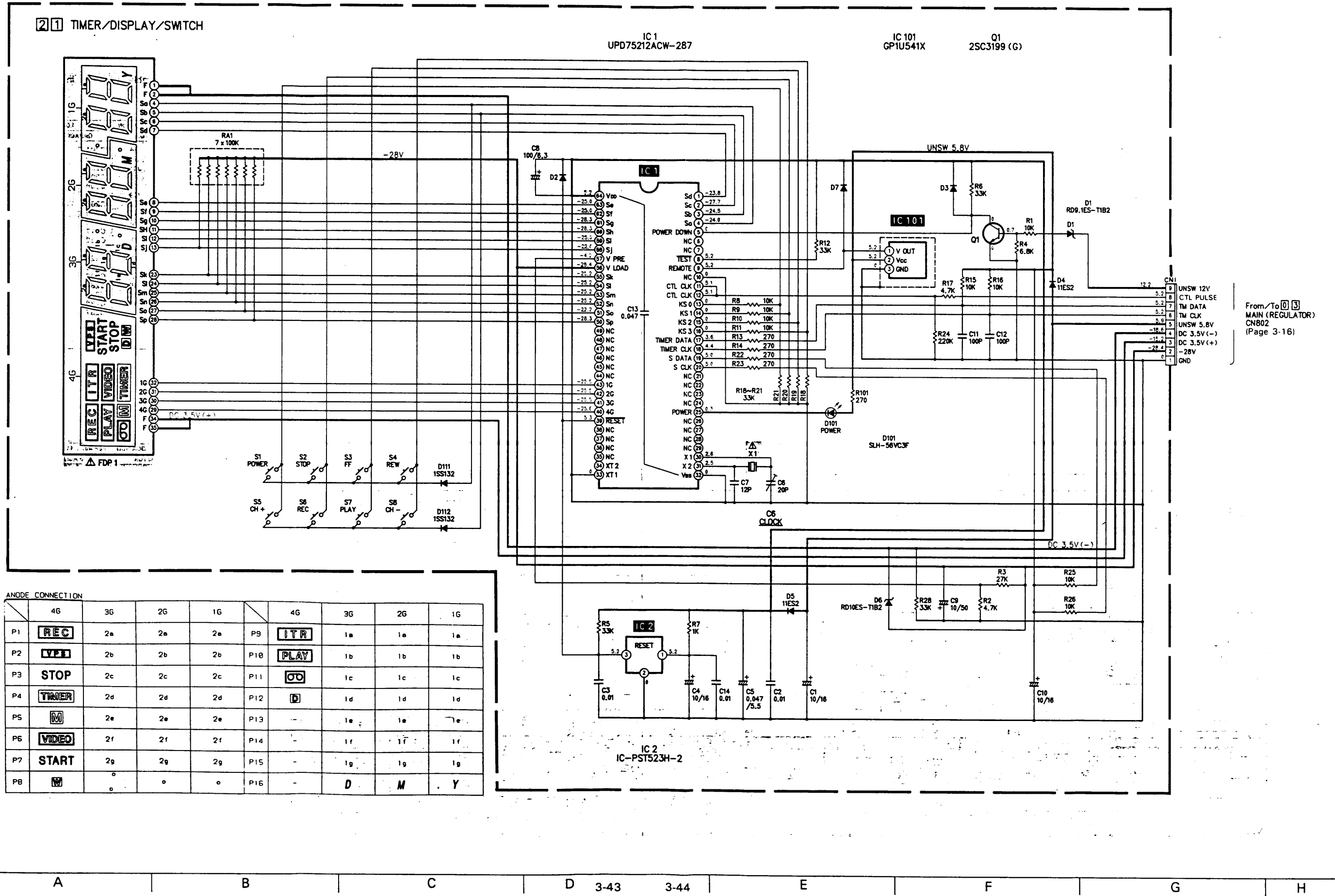
- Only chip parts

REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION	REF No.	LOCATION
RESISTOR		RESISTOR		CAPACITOR		CAPACITOR	
Q1	A8	R18	B9	R65	C8	C32	A7
Q5	A10	R19	C9	R66	C7	C33	B6
Q10	A6	R21	A7	R67	D4	C35	A6
Q11	C1	R22	A7	R68	D4	C37	A6
Q12	C1	R23	A4	R69	C6	C38	B6
Q13	D1	R24	A6	R70	A2	C40	B6
Q14	D1	R25	A6	R71	A2	C41	A5
Q16	B10	R26	A6	R72	A3	C44	B1
Q18	A5	R27	D2	R73	A3	C46	B2
Q19	B2	R28	C1	R74	A3	C48	A1
Q20	C3	R29	C1	R75	A3	C49	B1
Q21	D10	R30	C1	R76	A4	C50	B1
Q22	D9	R31	C1	R77	D7	C51	B1
Q23	D7	R32	C1	R78	C2	C54	D4
Q24	C6	R33	D2	R79	C3	C59	C8
Q25	A3	R35	B10	R81	B7	C60	C8
Q26	A3	R36	B10	R83	A6	C62	C8
Q28	B2	R37	B10	R84	C7	C63	C7
Q29	C3	R38	B10	R85	A8	C65	D5
Q30	A9	R40	B8	R208	A4	C67	D7
		R43	B7			C69	D5
DIODE		R44	B7	CAPACITOR		C70	D5
		R45	B7			C7	C5
D7	C1	R46	A7	C1	A9	C75	D6
D202	A4	R47	A6	C2	A9	C76	D6
		R48	B6	C4	B9	C79	A2
RESISTOR		R49	B5	C8	A7	C80	A3
R1	B8	R51	A5	C9	A7	C84	C3
R2	A9	R52	B2	C11	A4	C91	B7
R3	A9	R53	B2	C12	A7	C93	B8
R5	A9	R54	B3	C13	A7	C95	A7
R6	B9	R55	C2	C14	A6	C96	A6
R10	A9	R57	B3	C16	B10	C97	C10
R11	A10	R58	B1	C17	B10	C98	B3
R12	A10	R59	D10	C18	B10	C99	B2
R13	A8	R61	D10	C20	B9	C100	B9
R16	C10	R62	C9	C27	A8		
		R63	D9	C29	B7		



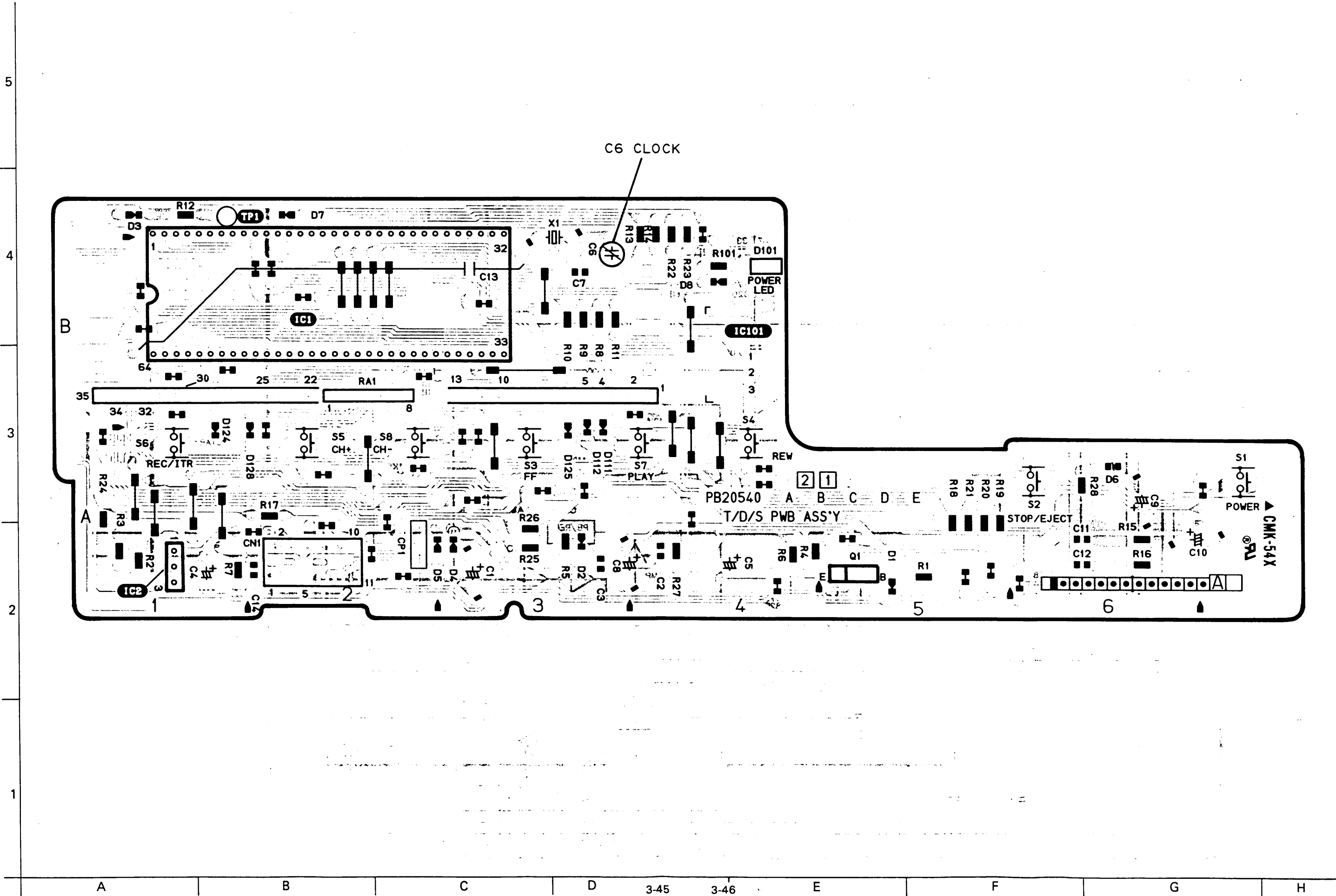
3.24 TIMER/DISPLAY/SWITCH SCHEMATIC DIAGRAM

5  
4  
3  
2  
1

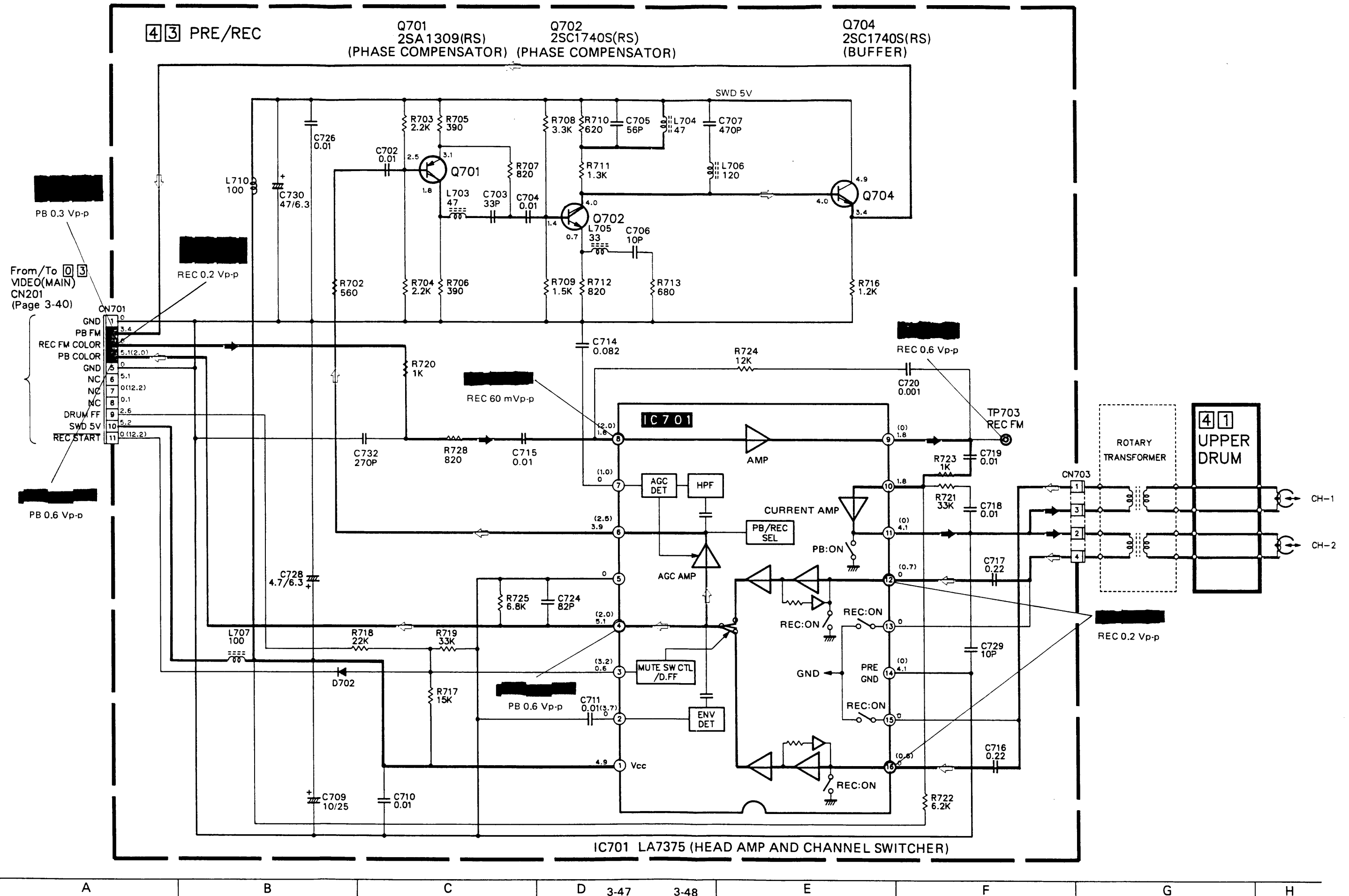




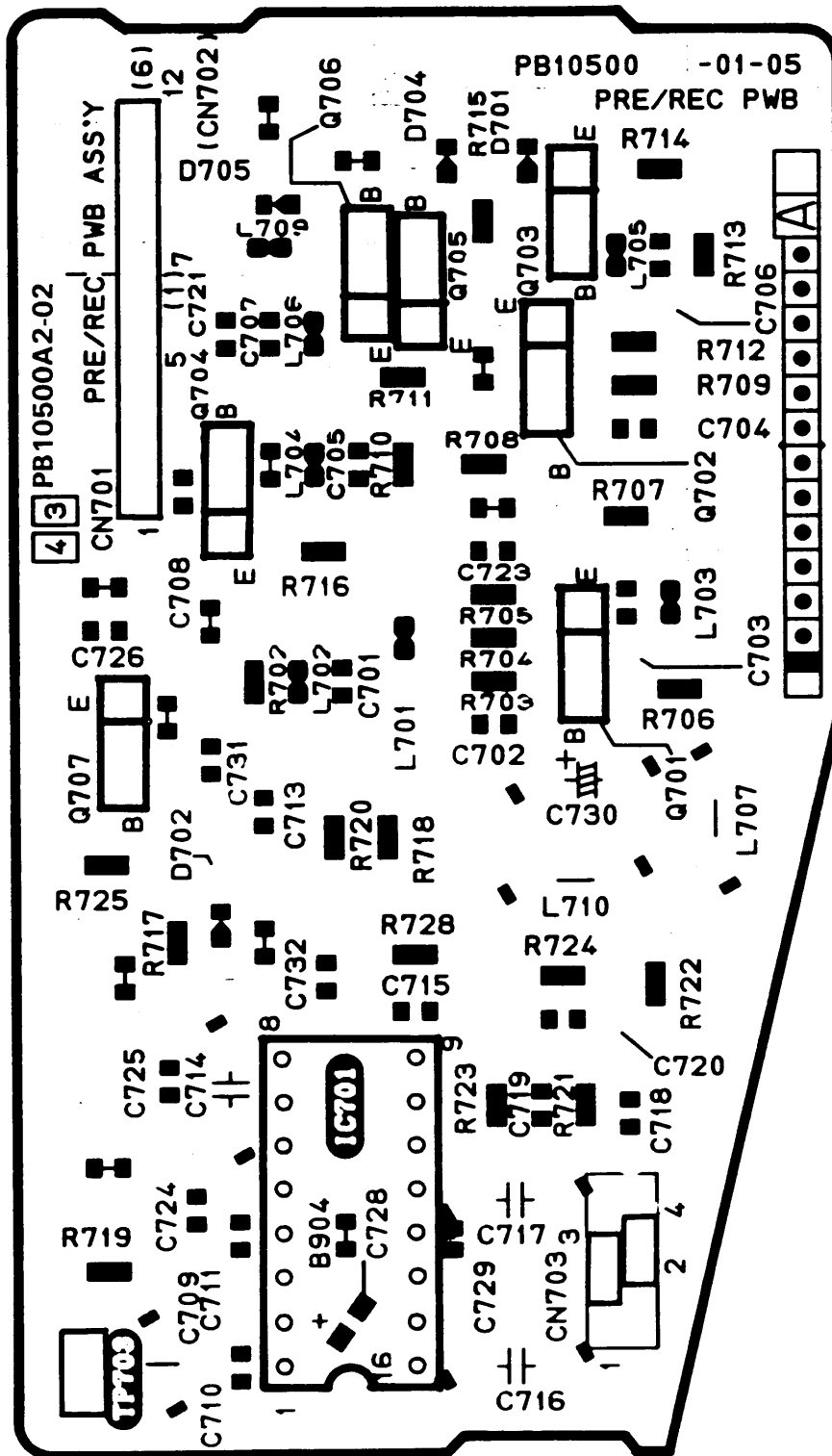
3.25 TIMER/DISPLAY/SWITCH CIRCUIT BOARD



43 PRE/REC



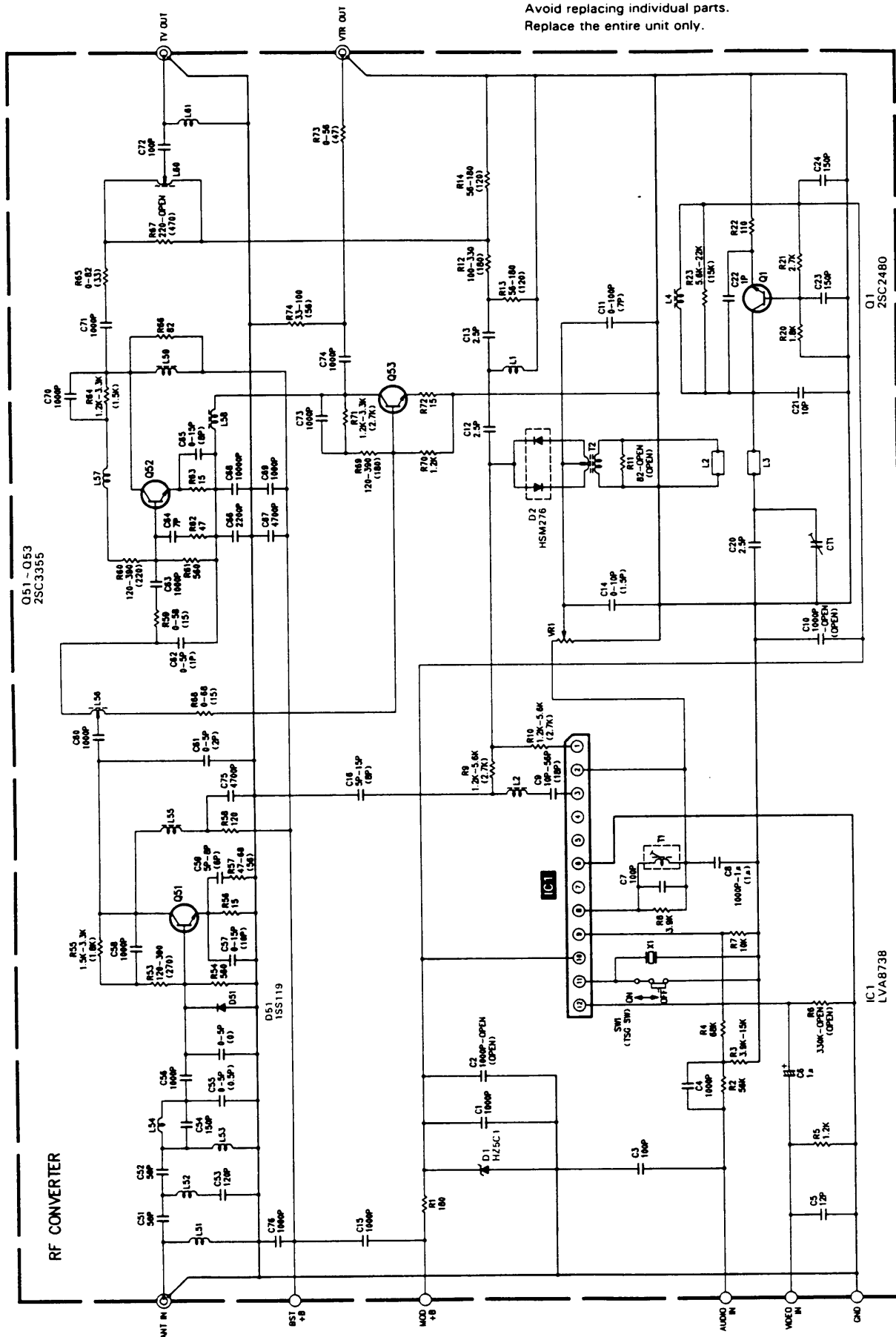
### 3.27 PRE/REC CIRCUIT BOARD



### 3.28 RF CONVERTER SCHEMATIC DIAGRAM

#### Note:

1. All parts shown in this schematic are critical for safety.
2. This schematic is only for reference.  
Avoid replacing individual parts.  
Replace the entire unit only.



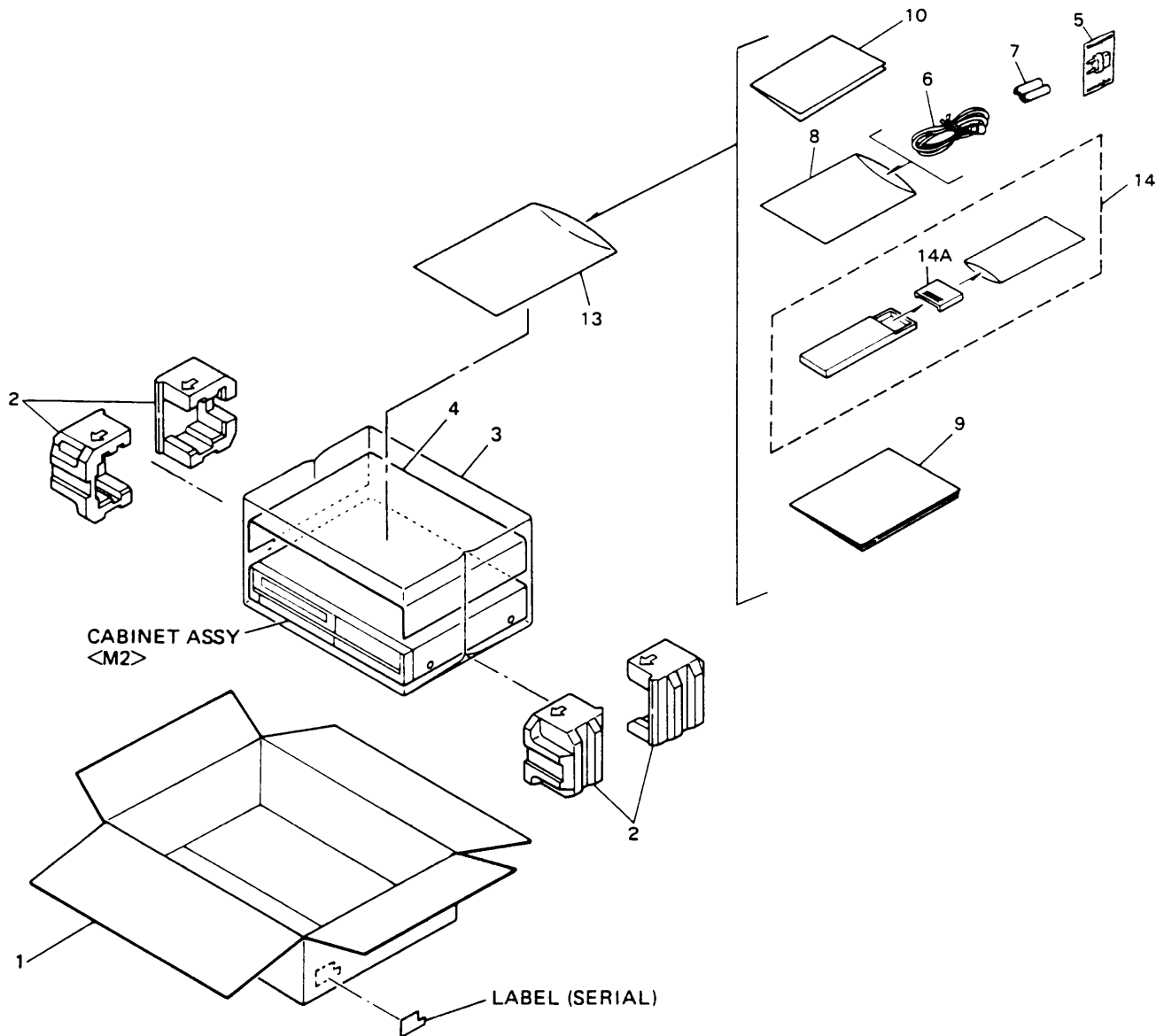
## SECTION 4 EXPLODED VIEWS AND PARTS LIST



### SAFETY PRECAUTION




Parts identified by the  symbol are critical for safety. Replace only with specified part numbers.

NOTE: <M> indicates mechanical symbol number.

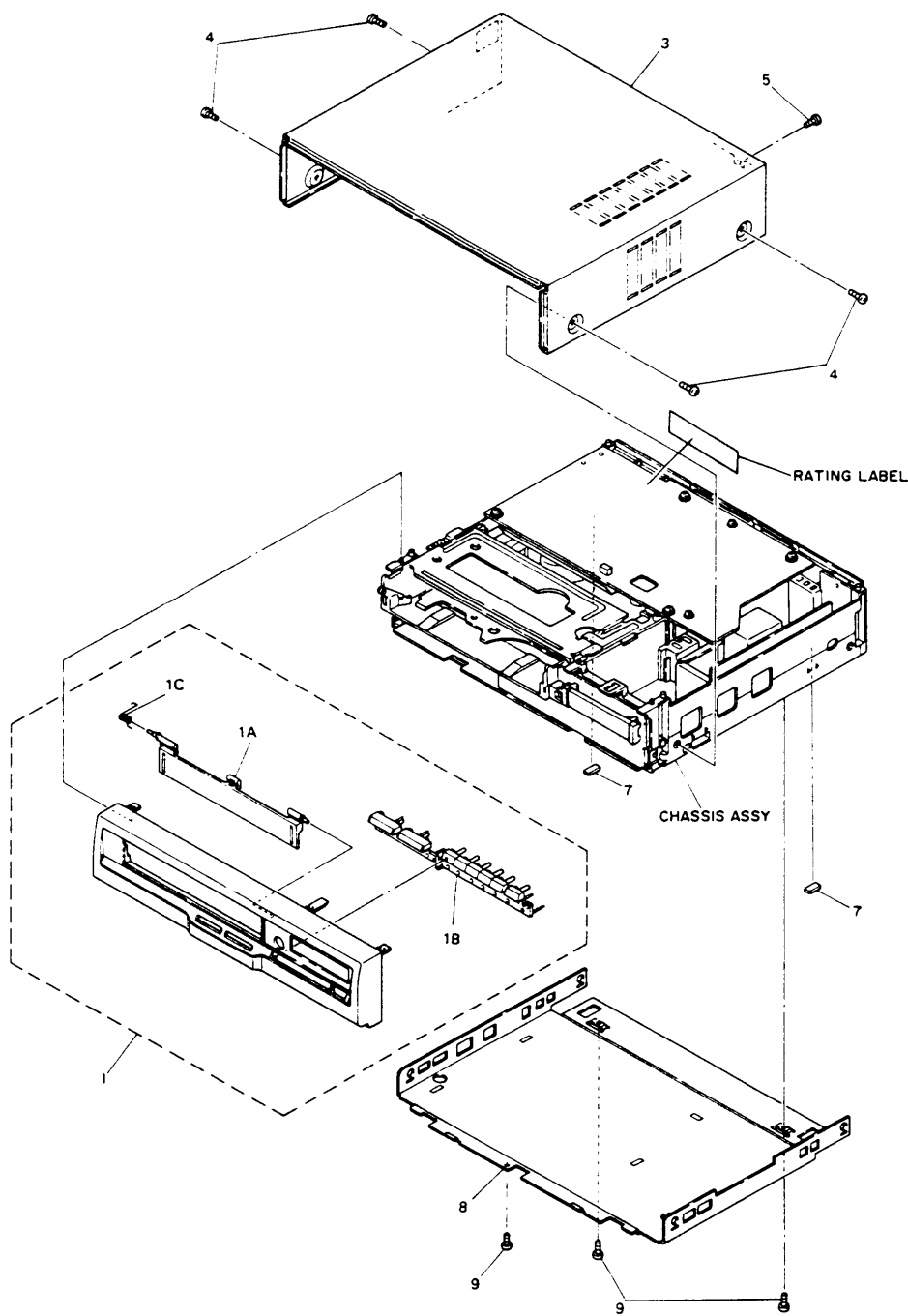
### 4.1 PACKING ASSEMBLY <M1>



	REF.No	PART No.	PART NAME,DESCRIPTION
*****			
<b>PACKING ASSEMBLY &lt;M1&gt;</b>			
	1	PQ33766-29	PACKING CASE
	2	PQ34054A	CUSHION ASSEMBLY
	3	PQM30021-72-17	POLY BAG
	4	PQ41026-28	PROTECT SHEET
	5	QMC0271-001	CONVERSION PLUG

	REF.No	PART No.	PART NAME,DESCRIPTION
	6	PU59168-3	RF CABLE
	or	PU59167-3	RF CABLE
	7	UM-4NJ2P	BATTERY, X2
	8	QPGA020-02005	POLY BAG
	9	PU30425-1255	INSTRUCTIONS
	10	TCN-3379	TAPE CATALOG
	13	QPGA025-03505	POLY BAG
	14	PQ21206F	REMOTE CONTROLLER
	14A	PQ33885	CAP(BATTERY)

4.2 CABINET ASSEMBLY <M2>



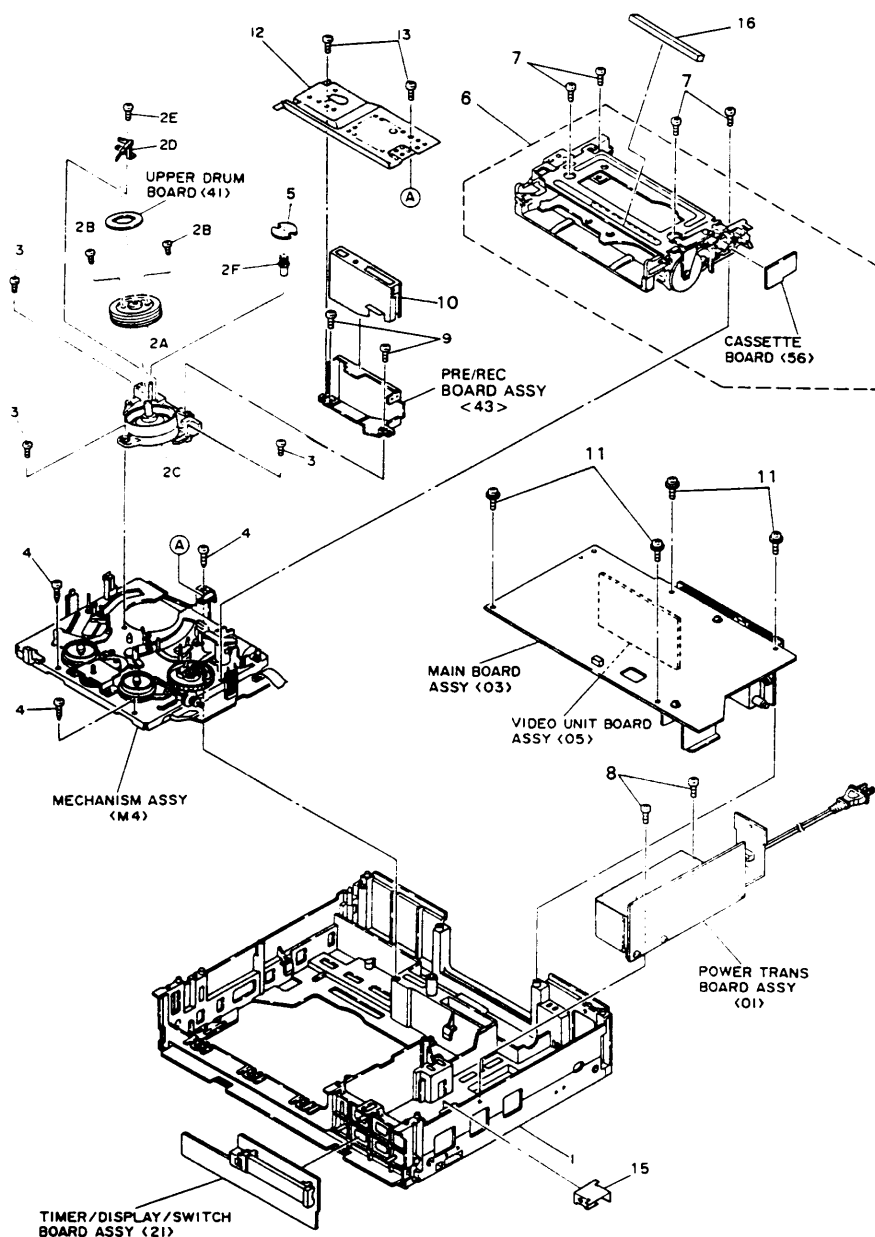
REF.No	PART No.	PART NAME,DESCRIPTION
*****		
CABINET ASSEMBLY <M2>		
1	PQ11114G	FRONT PANEL ASSEMBLY
1A	PQ21173	CASSETTE DOOR
1B	PQ21174-3	BUTTON

REF.No	PART No.	PART NAME,DESCRIPTION
1C	PQ45165	TORSION SPRING
3	PQ11117	TOP COVER
4	PQ43827	SPECIAL SCREW, X4, TOP COVER
5	SDST3008M	SCREW, FOR TOP COVER
7	PQ43013-3	FOOT,X2
8	PQ11118-2	BOTTOM COVER
9	SDSF3010Z	SCREW,X3,FOR BOTTOM COVER

### 4.3 CHASSIS ASSEMBLY <M3>

#### BEWARE OF BOGUS PARTS

Parts that do not meet specifications may cause trouble in regard to safety and performance. We recommend that genuine JVC parts be used.



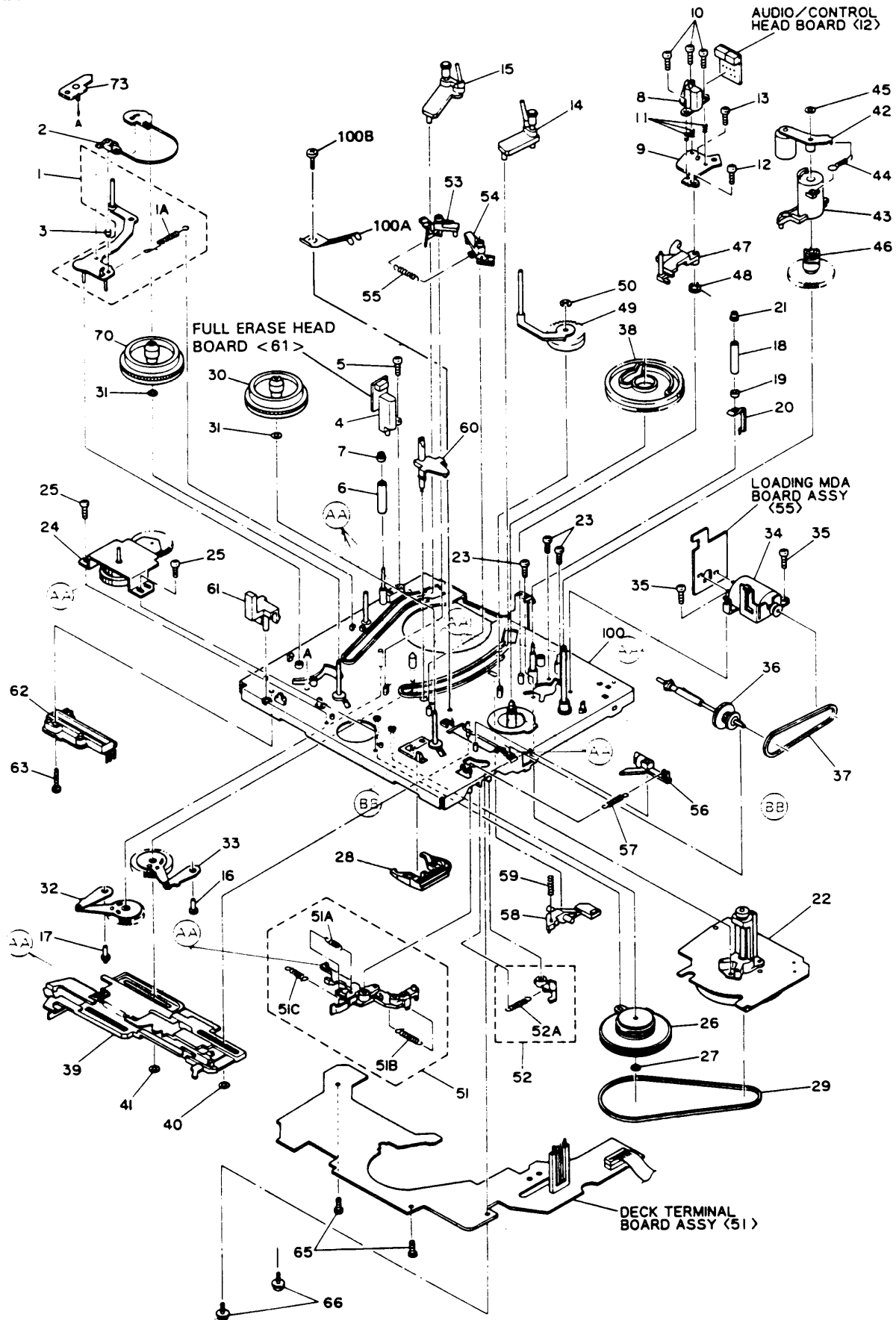
REF.No	PART No.	PART NAME,DESCRIPTION
*****		

### CHASSIS ASSEMBLY <M3>

1	PQ11108-3	BOTTOM CHASSIS
2A	PDM2008C-5	UPPER DRUM ASSEMBLY
2B	PDM4165A	DRUM SCREW ASSEMBLY, X2
2C	PDM2138Y	LOWER DRUM MOTOR ASSEMBLY
2D	PDM4229A-1	BRUSH ASSEMBLY
2E	SPSG2606Z	SCREW
2F	PDM4226A	ROLLER ASSEMBLY
3	SPST2610Z	SCREW, X3, FOR DRUM ASSEMBLY
or	SDST2610Z	SCREW, X3, FOR DRUM ASSEMBLY

REF.No	PART No.	PART NAME,DESCRIPTION
4	PQ43831	SPECIAL SCREW,X3 FOR MECHANISM
5	PQ45160	INERTIA PLATE
6	PUS29499G	CASSETTE HOUSING ASSEMBLY
7	SPST2608Z	SCREW, X4, CASS.HOUSING ASSY
or	SDST2608Z	SCREW, X4, CASS.HOUSING ASSY
8	PQ43831	SPECIAL SCREW,X2 FOR P.TRANS
9	SDSG2606Z	SCREW,X2,FOR PRE/REC
10	PQ33802-1-2	SHIELD CASE,FOR PRE/REC
11	GPSF2610Z	SCREW,X4,FOR MAIN BOARD
12	PQ33737	SHIELD PLATE(DRUM)
13	SDST2608Z	SCREW,X2 FOR SHIELD PLATE
15	PQ45564	EARTH PLATE
16	PQM30029-166	SPACER

4.4 MECHANISM ASSEMBLY <M4>



Category	Part number	MARK
Grease	KANTO-G-31KAV	(AA)
Oil	COSMO-HV56	(BB)

NOTE: The section marked in (AA) and (BB) indicate lubrication and greasing areas.



△ REF.No PART No. PART NAME,DESCRIPTION  
\*\*\*\*\*

# MECHANISM ASSEMBLY <M4>

1	PQ43497E-11	TENSION ARM ASSEMBLY
1A	PQ43500	TENSION SPRING
2	PQ43501B-12	TENSION BAND ASSEMBLY
3	PQ43503-1-4	ADJUST PIN
4	PU60616	FULL ERASE HEAD
5	SDSF2614Z	SCREW, FOR FE HEAD
6	PQ43505-1-1	ROLLER
7	PQ43506	GUIDE POLE CAP
8	PEHE0182	AUDIO/CONTROL HEAD
9	PQ43509	HEAD BASE
10	PQ43687A	SPECIAL SCREW, X3
11	PQM30002-192	COMPRESSION SPRING, X3
12	SPSF2608M	SCREW
13	SPSP2606Z	SCREW
14	PU61103-2	POLE BASE ASSY (TAKE UP)
15	PU61151-2-3	POLE BASE ASSY (SUPPLY)
16	PQ43524	STOPPER
17	PQ43525	STOPPER 2
18	PQ43526-1-3	TAPE GUIDE
19	PQ43670-1-1	GUIDE FLANGE
20	PQ43675	TAPE GUARD
21	PQ43506	GUIDE POLE CAP
△ 22	PU61285	CAPSTAN MOTOR
23	SPSG2608Z	SCREW, X3
24	PU60618-1-3	IDLER GEAR UNIT
25	SPST2606Z	SCREW, X2
26	PU60953-1-2	CLUTCH UNIT
27	PQM30017-8	SLIT WASHER
28	PQ43532A-1	CHANGE LEVER ASSEMBLY
29	PQM30003-24	BELT
30	PU60858-1-4	REEL DISK (TAKE-UP)
31	PQM30018-54	SPACER, X2
32	PQ43537A	LOADING ARM ASSY (SUPLY)
33	PQ43542B	LOADING ARM ASSY (TAKE UP)
34	PQ43676B-5	MODE MOTOR ASSEMBLY
or	PQ43676C-7	MODE MOTOR ASSEMBLY

△ REF.No	PART No.	PART NAME,DESCRIPTION
35	SPST2606Z	TAPPING SCREW, X2
36	PQ43548A-2	WORM CLUCH ASSEMBLY
37	PQM30003-23	BELT
38	PQ32413-1-6	CONTROL CAM
39	PQ43555B-6	PLATE ASSEMBLY
40	PQM30017-12	SLIT WASHER
41	PQM30017-8	SLIT WASHER
42	PQ43558A	PINCH ROLLER ARM ASSEMBLY
or	PQ43558B	PINCH ROLLER ARM ASSEMBLY
43	PQ32415	PINCH ROLLER PRESS LEVER
44	PQM30001-233	TENSION SPRING
45	PQM30017-12	SLIT WASHER
46	PQ32416-2	PINCH ROLLER CAM
47	PQ43567A-8	GUIDE ARM ASSEMBLY
48	PQ43569-1-3	TORSION SPRING
49	PQ43570A-1	HALF LOADING GEAR ASSEMBLY
50	PQM30017-12	SLIT WASHER
51	PQ43575A-5	CANCEL LEVER ASSEMBLY
51A	PQM30001-273	TENSION SPRING
51B	PQM30001-237	TENSION SPRING
51C	PQM30001-274	TENSION SPRING
52	PQ43578A-2	HOOK ASSEMBLY
52A	PQM30001-238	TENSION SPRING
53	PQ43581C	MAIN BRAKE ASSY (SUPPLY)
54	PQ43582B	MAIN BRAKE ASSY (TAKE UP)
55	PQM30001-251	TENSION SPRING
56	PQ43583A	SUB BRAKE ASSY (TAKE-UP)
57	PQM30001-235	TENSION SPRING
58	PQ43584A-5	CAPSTAN BRAKE ASSEMBLY
59	PQM30002-201	COMPRESSION SPRING
60	PU60621-1-2	LED HOLDER, (INCL.LED:D1)
61	PU60624-1-4	REC SAFETY SWITCH
62	PU60622-1-1	SLIDE SWITCH, (S3)
63	SDSF2614Z	SCREW
65	SDST2616Z	SCREW, X2
66	GPSF2608Z	SCREW, X2
70	PU60859-1-4	REEL DISK (SUPPLY)
73	PQ44246	TENSION BAND BRACKET 3
100	PQ20650D-20	MAIN DECK ASSEMBLY
100A	PQ43849	EARTH PLATE
100B	SPST2604Z	SCREW